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MONTHLY INTERNATIONAL FEATURE ISSUE

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VOLUME 121, NUMBER 5

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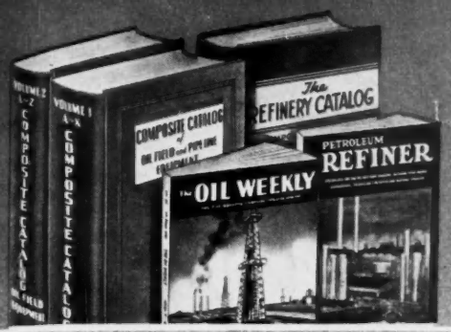

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Looking Ahead

WITH THE EDITOR

THE present oil field equipment shortage brought about by the all-out effort to put a maximum of steel into the war effort, and the postwar labor strifes have brought additional problems of equipment conservation to the operator who must keep his present equipment in operation for its maximum life.

MULTI-PUMPING PROBLEMS

J. I. Laudermilk, head of the department of petroleum engineering, New Mexico School of Mines, is the author of a second article on counterbalancing pumping wells through the use of graphical mechanics. The first, "Graphical Mechanics of Counterbalancing Individual Well Pumping Units," by the same writer, appeared in THE OIL WEEKLY, September 28, 1942, and is now followed by a second article, "Graphical Mechanics of Counterbalancing Multiple Well Pumping Assemblies" to appear in the issue of April 8.

The problem of graphically solving the problem of properly counterbalancing a system involving more than one pumping well is treated in a mechanical and mathematical manner.

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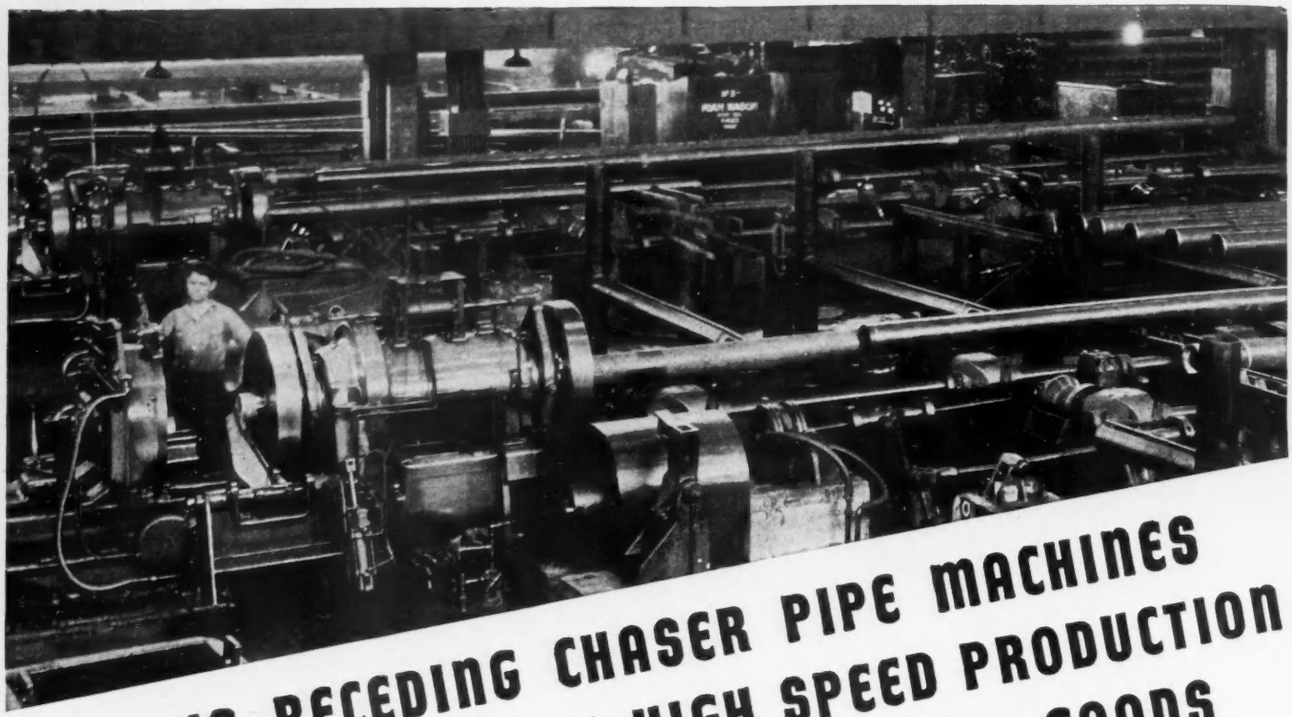

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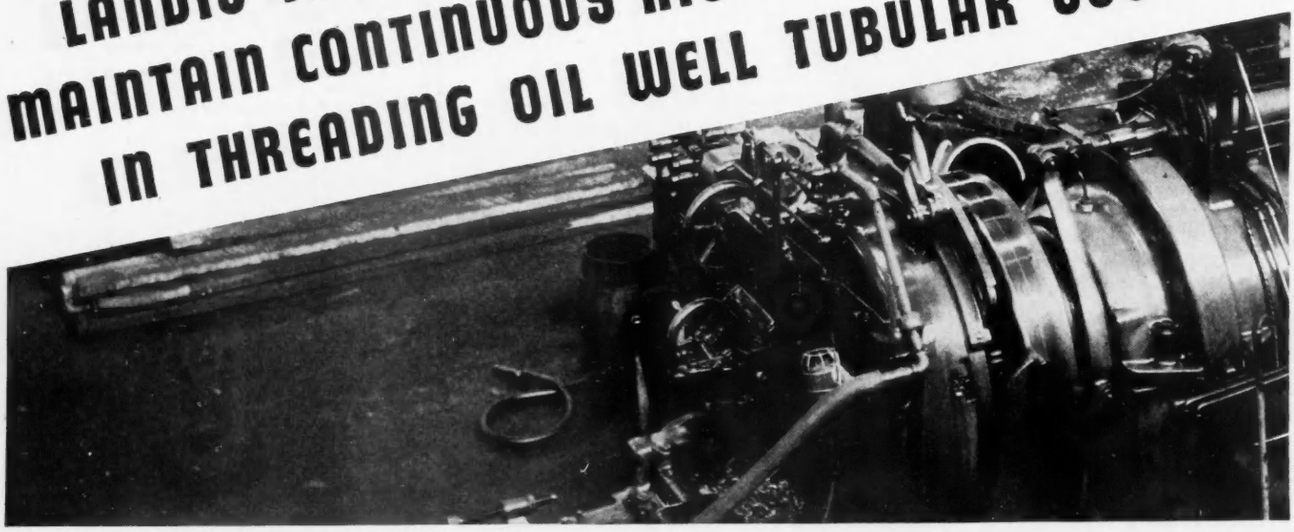

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Price Regulation And Oil Equipment

OIL producers are not the only people in the oil industry who are having trouble with the OPA price regulations. Investigation reveals that a large percentage of oil field equipment is being sold on OPA prices which are less than the cost of manufacture and distribution.

Most OPA prices on oil field equipment have not been changed since 1941. Since that time a lot of things have happened. Wage scales of workers have gone up. In many instances the production per day of the worker has gone down. Now manufacturers face a substantial increase in the price of their raw materials and the manufacturer has been caught in the squeeze.

However, steps are being taken to rectify this condition which is an intolerable one. A survey, at the suggestion of OPA, is under way. Unquestionably the survey will reveal a situation demanding immediate rectification.

The oil industry itself has profited in the past by an aggressive supply and equipment branch. We know of no other industry in which the equipment arm and the industry itself operate in such close harmony.

The record of the past 25 years has been a record of constantly improving equipment, both in design and manufacture. This equipment improvement has played a substantial part in the success of the oil industry in solving many perplexing problems. It certainly is not to the interest of the oil business that its suppliers be crippled.

Diesel Power Growth

FROM 20 to 40 percent of all locomotives operated by American railroads in 10 years will be diesel-powered, in the opinion of R. Tom Sawyer, engineer, diesel equipment, of the American Locomotive Company. Recently he told the American Society of Mechanical Engineers in Washington, D. C.: "If we add all switching and road locomotives in service today, we find that over 10 percent are diesel-powered. This is unusually high, since this change has largely taken place in the past 10 years. In the next ten years, this percentage should increase to at least 20 or even 40 percent.

"Each type of power," he continued, "will find its own place. No one is going to push one type more than another unless it pays to do so and the railroads will put that type of locomotive in service which gives them the greatest return on investment."

The diesel locomotive will someday have to face competition from atomic energy in addition to gas turbine power, in Sawyer's opinion. However the advent of atomic-powered units is a long way off, he thinks.

Oil in Antarctica!

WE PRESENT in this International Feature Issue an exclusive article which our readers doubtless will find highly interesting and informative. The article deals with the unusual and intriguing subject of the possibilities of oil in Antarctica. It will appeal to the pioneering spirit which is strong among oil men.

The author, a geologist who went to Antarctica on two expeditions, urges the nation to consider the great South polar continent as a potential source of minerals for the United States, to be secured as a future reserve by immediate government-sponsored exploration on a systematic and large-scale basis.

Antarctica definitely has large coal deposits, and it is believed to have favorable possibilities of oil and other minerals.

Development admittedly would involve difficulties. But the author has seen modern equipment in use on the Greenland Ice Cap as well as in the Antarctica. And he feels confident that American ingenuity could solve the development problems.

Refresher Courses a Real Industry Service

THANKS of the oil industry are due the Department of Petroleum Engineering of Texas A. & M. College for the arrangement whereby some 175 men were brought up-to-date last month on the very important subject of electric well logging. This was a real service not only to the industry's stay-at-homes who needed a refresher on the rapid developments in this particular field, but was a godsend to returned service men seeking to get back into stride after a long layoff.

At least six states were represented and one man came from Canada. Some companies sent as many as 19 men to the conference, which was handled so successfully by Harold Vance, head of the department, and Hubert Guyod, consultant. Twelve lectures were given during the five days, these in addition to actual well dedmonstrations by service companies which proved most enlightening.

Those attending were high in their praise, declaring that much knowledge of value had been imparted.

Texas A. & M. held these conferences regularly before the war. One we recall was on "Practical Geophysical Methods for Oil Exploration," another on "Reservoir Conditions in Oil Fields," and a third on "Gas Lift Methods of Producing Oil." Three conferences planned this spring will "make up for our inability to conduct them during the war years." The second conference, on "Reservoir Engineering," is scheduled April 22-26, and the third is to start May 13, its topic to be announced.

One such conference each year "on a subject which seems of most widespread interest to the men in the industry" is A. & M.'s program. Which shows that they are never satisfied with laurels won, but are ever alert to be of continuing service toward maintaining America's high standard of petroleum engineering.

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The Week's News

PRODUCERS dissatisfied with the OPA's token increase in crude prices are resentful of what they consider a "brush-off" given industry representatives seeking to talk the matter over with Price Administrator Paul A. Porter. Story below.

Price Increase Date—Meanwhile, it was disclosed that the effective date of the increase was deferred from March 29 to April 1 at the request of companies on the ground the earlier date would cause bookkeeping confusion, a request made at the suggestion of OPA officials who felt the April 1 date preferable. At the present production rate the delay will cost producers $1,320,000. Story Below.

Industry Case Summarized—Senate hearings on all phases of the oil situation which have been running approximately a year wound up last week with an able summarization of the testimony and recommendations by Alfred Jacobsen, president of Amerada Oil Corporation. Page 13.

Role of the Co-op—An interesting sidelight was co-op figures showing that the farm organizations produced more than 1,600,000 barrels of crude a year but buy 19,000,000 barrels from independents and majors, and are prepared to follow the latter into foreign fields if it becomes necessary. Page 13.

Plants for Sale—War Assets Corporation has placed more refineries and carbon black plants on the auction block, and reported the sale of one—the Baytown toluene plant. Page 12.

Disposal Plan Challenged—Surplus Property Administration recommendation for disposal of the Big Inch pipe lines were challenged in a supplemental report by B. I. Graves' industry subcommittee, which contended that conversion to natural gas is the best possible solution of the problem. Page 16.

Building Restrictions—Construction restrictions, designed to speed up home building and issued by the Civilian Production Administration, will have no effect upon oil producing operations or pipe lines and, it is believed, little or no influence upon necessary refinery construction work, but expansion of retail outlets may be limited.

Anglo-American Oil Pact—Hearings on the Anglo-American petroleum agreement likely will not be called before the middle of May, because of a recess which is planned for Congress through the last half of April.

Equipment Price Ceilings—Suspension of ceiling on oilfield equipment is under consideration in the OPA, and a decision may be announced within a week. Tubular goods producers also may get relief to compensate for higher steel prices and wage rates, possibly in the shape of a 10 percent increase in prices. Story below.

Gas Conservation Program—West Texas and Panhandle operators outlined a program whereby 250 million feet of flared gas daily would be conserved by expenditure of $50 million. Page 15.

Oil Is Key—Oil continues the key in the Russian-Iranian dispute. The Soviet now proposes a joint company similar to Anglo-Iranian which would engage in oil operations in Iran. Page 12.

Texas Stands Firm—Two of the Railroad Commissioners oppose raising Texas current allowables; so the Navy and War Shipping Administration was turned down in its effort to get more oil. Page 15.

Suspension Seen on Price Ceilings for Oilfield Equipment; No Action on Oil

Creaking machinery of the OPA failed to function with sufficient speed to permit issuance of the formal order raising the crude price ceiling 10 cents per barrel as scheduled March 29 and although officials said the increase would be effective April 1 the actual order was not expected before that date at the earliest.

The delay was due, in part, to the preoccupation of Administrator Paul A. Porter with the legislation extending price control, on which he spent the greater part of the day March 29 before the House Banking and Currency Committee. Porter's signature was necessary before the order could be published.

OPA officials said that reports reaching Washington indicated that many were holding crude back in anticipation of the higher price, and referred particularly to Illinois where they said large quantities were being held. No particular significance was attached to the situation however. It merely paralleled the experience in other commodities when it became known that a price increase was imminent.

Aside from much talk, only a few new facts have entered the petroleum price situation since a week ago. The industry's avowed objective, the immediate complete removal of governmental determination of oil prices, remains unachieved, although "token" revisions have been authorized by OPA.

The nearest approach to a committal from the government on complete oil-price decontrol was the letter of Chester Bowles to Texas Congressman Patman saying controls may be suspended "within six months or possibly by June 30," with the reservation that control could be resumed if "necessary." This means there has been no promise of decontrol in less than 3 more months.

However, Noah Dietrich, Houston, executive vice president of Hughes Tool Company, was quoted in the press last week as forecasting "almost immediate" removal of price controls in the oil industry as well as in the oil industry equipment field.

Equipment Relief

Suspension of price ceilings on oilfield equipment has been recommended by the OPA machinery division and is expected to be passed up on "policy-making levels" within a week.

The suspension, urged by representatives of the equipment manufacturers who recently conferred with OPA officials, was recommended on the basis of a survey which showed definitely that the industry is rapidly catching up with its backlog of orders.

A program for the decontrol of capital goods is being readied for effectuation by Price Administrator Paul A. Porter, and upon its scope, it was said, will depend the decision on oilfield equipment.

Should suspension not be granted, the OPA will make a study designed to provide the basis for an industry-wide raising of price ceilings. A large number of companies have come in with individual requests for relief, which have been held in abeyance until the question of suspension is settled.

In agreeing to recommend suspension machinery, division officials told the

Pipe Line Tax Declines

Federally-collected pipe line transportation taxes fell below the million dollar mark in February for the first time since April, 1944, it was reported March 31 by the Internal Revenue Bureau. February collections were $979,122 against $1,355,201 in January and $1,522,-987 in February, 1945, the bureau announced.

Gasoline tax collections were $32,423,-442 against $25,495,456 in January, and lubricating oils returned $5,567,162 against $4,187,536.

manufacturers the recommendation would immediately be withdrawn in the event there were indications that deliveries were being slowed down so as to reap the advantage of higher prices.

The manufacturers also were warned that the OPA action will be suspension and not removal of price controls, and that they will be slapped on again if excessive price increases appear.

Price increases which will follow suspension of control will be substantial, it is believed in Washington. The manufacturers have long contended that they were operating at serious disadvantages, more recently aggravated by the increase allowed in the price of steel and high wage rates.

Tubular goods manufacturers also have been asking for relief for the same reason, and are expected to be given an increase in ceiling prices in the near future, probably about 10 percent.

Effective Date

Some clarification of dates has been made regarding the "token" oil price readjustment of OPA. The early reports (THE OIL WEEKLY, March 25) that crude ceilings would be raised effective March 29 were corrected to reveal that the order itself would bear that date but that effective date of new ceilings would be April 1, in order to simplify bookkeeping. It also was stated by OPA that the spot check for considering further oil price readjustments was expected to bring in reports by April 15. This indicated that more "token" readjustments might be made soon—possibly as of May 1, since OPA sees advantages in making revisions on the first of the month.

The National Crude Oil Industry Advisory Committee attacked Price Administrator Paul A. Porter for the cavalier treatment a delegation met with at a meeting with OPA officials March 20. That meeting lasted only a few minutes, Porter leaving because of other duties, followed at intervals by Geoffrey Baker, associate deputy administrator; Paul M. Green, head of the accounting division, and J. H. Reppert, head of the petroleum price branch, to answer the telephone.

Ask 35-Cent Jump

The committee reiterated its recommendation for a 35-cent increase and suspension of controls over crude and products by not later than June 30, and in a letter to Porter March 25, Russell B. Brown, committee counsel, forwarded the recommendation to the price administrator.

Laney to Speak at Banquet During Compact's Sessions

Governor Ben T. Laney of Arkansas will speak at a banquet in Tulsa Friday night, April 12, during the Interstate Oil Compact Commission's spring quarterly meeting. His subject will be "Industrial Development in Arkansas" and in keepin with the general theme of the compact meeting which is to be devoted to a study of advancement in industrial research relating to oil and gas.

Joint Iranian-Russian Company Is Proposed by Reds for Oil Operations

Oil was revealed officially as having the key role in the dispute between Russia and Iran when last week the Russian delegate to the UNO council meeting withdrew from its deliberations following the council's action in refusing to meet his demand for delaying until April 10 discussion of the Iranian situation.

Among revelations by the Iranian delegate was that Russia had proposed it would abandon its demand for an oil concession and ask instead the formation of a joint stock company with 51 percent of the shares owned by Russia and 49 percent by Iran. This counter-proposal superseded the Soviet's previous demand for oil concessions in the five northern provinces of Iran and such an arrangement would be analagous to Britain's position through its Anglo-Iranian Company.

Iran claimed it could not discuss this or any other proposal until Red troops were removed from the area at issue.

During the week Dr. Nicholas Murray Butler, president-emeritus of Columbia University, said Russia should have oil concessions in Iran and Dr. Frederick Haussman, former oil adviser to the Venezuelan government argued that the Anglo-American oil pact would offer a neutral basis for discussion with Russia and other nations on the issue of Iran's oil. He called for a marketing agreement with respect to Eastern and Western Europe which would release needed drilling and refining equipment to the Russians, thus, he said, allowing Russia to push exploration of her own great petroleum resources and so relieve pressure on the Middle East.

WAC Lists War Plants Now for Sale or Lease

Ten refineries built by the government during the war were offered for sale or lease last week by WAC and include plants of:

Southport Petroleum Company and Republic Oil Refining Company near Texas City, Texas; Eastern States Petroleum Company of Texas near Houston; Crown Central Petroleum Corporation, Pasadena, Texas; two Continental Oil Company refineries at Ponca City, Okla.; Wilshire Oil Company at Norwalk, Calif.; Mohawk Petroleum Corporation at Bakersfield, Calif.; Cooperative Refinery Association at Coffeyville, Kansas, and Great Southern Corporation plant, Corpus Christi, Tex., together with butane plants at Driscoll and Agua Dulce.

WAC last week sold all usable facilities of the Baytown Ordnance Works toluene plant to Humble Oil & Refining Company, its wartime operator, for $6,948,394 in cash.

Although the plant, the first to be built for the production of toluene from petroleum, cost the government $14,185,866, it was said the purchase price represented a 100 percent return of the present estimated fair value of the facilities sold. Facilities not purchased cost approximately $608,000, it was said.

Four complete and two incomplete carbon black plants with a total capacity of 125 million pounds also have been placed on the market including:

Cabot Carbon Company, Guymon, Okla., capacity 15 million pounds, with its own gas wells on the site; Columbian Carbon Company, Seagraves, Texas, capacity 15 million pounds, with a 20-inch gas supply line; Continental Carbon Company, Sunray, Texas, capacity 20 million pounds, with a 16-inch supply line; Charles Eneu Johnson and Company, Monument, New Mexico, incomplete but planned for a capacity of 15 million pounds, with a 14-inch supply line; Panhandle Carbon Company, Eunice, New Mexico, capacity 15 million pounds; and United Carbon Company, Odessa, Texas, incomplete but planned for a capacity of 45 million pounds, with four supply lines, 14, 16, 24 and 21 inches, respectively.

Tells of Loss Refiners Take in Fuel Oil Output

Washington hearings in the natural gas investigation of the Federal Power Commission will open June 17. It will be the eighth hearing in a series which opened in Kansas City last September 18, the seventh of which is running this week in Charleston, W. Va.

Gulf Coast refineries are producing bunker C fuel oil at a loss of 1.03 cents per gallon and for that reason are unwilling to attempt to supply Navy needs, Secretary of the Navy James E. Forrestal was informed last week by J. P. Coleman, president of North Texas Oil and Gas Association.

Coleman declared that fuel oils have been underpriced for many years and maintained that it should at least pay its own way because "a barrel of fuel oil to run a ship is as valuable as a barrel of gasoline to run a plane."

OPA orders freezing prices at depression levels have made an impossible situation for the independent producers, although the refiners "had in the meantime raised most product prices to a point where they had comfortable margin from refining a barrel for crude," he said.

Coleman charged that "certain" refiners and purchasers would like to see overproduction, but contended that this would not make fuel oil more plentiful for the Navy and "either the PAW must be revived or controls must be taken away from OPA.

Oil Co-Ops Have Inning as Industry Summarizes Case Before Senate Group

Hearings in the Special Senate Petroleum Committee's investigation of the oil industry closed last week when A. Jacobsen, president of Amerada Petroleum Corporation, made a plea that any national petroleum policy recommended to Congress shall be comparable with the general policies established by the industry through more than 80 years.

Jacobsen summarized industry testimony and submitted recommendations, as follows:

Cartels: Unless the State Department can persuade certain countries to open their oil markets to free competition, American oil companies will be forced either to conform to the type of regulation or cartel in force or retire from business in a given country. The latter would have a bad effect on our domestic economy, adversely affect our national security, work to the disadvantage of most American industries engaged in foreign trade and play into the hands of our foreign competitors. If the companies are to engage in trade in cartel countries, they should be allowed to operate abroad without fear of antitrust prosecution.

No Oil Famine

Domestic sources: In spite of the recent declining rate of new discoveries, there need be no fear of an oil famine or even an oil shortage in the foreseeable future provided the domestic producer receives a proper price for his oil. Even if the declining discovery rate should continue, a substantial volume of new oil will be discovered each year, and in the meantime continuing advances in the technology of finding, producing and refining oil will enable us to utilize to greater advantage the supplies we have. In the meantime, further substantial advances in the art of converting natural gas and coal into oil can be definitely expected.

Government lands: Lessees under Interior Department control should be freed of the threat of arbitrary action inherent in the provisions of the lease form, and legislation broader than the O'Mahoney-Hatch bill should be enacted to modernize the leasing law.

Foreign operations: American oil companies operating abroad do not expect any guarantee or help from their government with regard to the financial risks inherent in the oil business. The American companies, however, do consider that they are entitled to help from their government in connection with "political risks." If a company goes into a foreign country, operates according to its laws, acquires titles to its holdings legally, and succeeds in developing valuable properties, then the company does think it is entitled to the diplomatic protection of its government against any attempt at outright confiscation, expropriation with inadequate payment, or any less direct way of depriving it of its property, on the part of a foreign government.

Continental shelf: Prospects of finding oil under the continental shelf vary from practical impossibility to practical certainty along the coasts of Texas and Louisiana. However, the greatest underwater depth at which drilling has so far been accomplished is approximately 90 feet in the protected waters of Lake Maracaibo, Venezuela, and to drill at even 200 feet—let alone 500 or 600—in open waters would present great technical difficulties which, if they could be overcome at all, could only be conquered at enormous cost.

Conversion Said Cheaper

"In fact," Jacobsen said, "it is most likely that it will be far cheaper to produce oil by conversion from coal than to drill at any great depth of water in the open sea. Therefore, while the exploration of the continental shelf within a practical, commercial drilling depth of water should not be neglected, we shall not be justified in looking upon the continental shelf as a source of any really important addition to our oil resources until it has been demonstrated that drilling in deep water in the open sea is feasible at a justifiable cost. Personally, I consider this a most unlikely contingency."

Requirements: With the development of foreign fields and the declining rate of discoveries in this country, it is logical to expect that foreign fields will increasingly supply foreign markets, with a corresponding decline in our net exports of oil from this country. With regard to the problem of imports, the best answer would seem to be that we should follow an import policy which will permit our domestic needs to be met at reasonable prices, but which will not flood the market with foreign oil or keep prices at a level which would discourage an adequate amount of exploration, wildcatting or secondary recovery activities, nor retard the continuity of technical innovation and progress in the domestic field.

Surplus disposal: Because all but one of the government-built refineries were integrated with existing plants, the logical buyers are the companies owning the original plants. Inflated war costs should be disregarded and estimated postwar replacement cost less reasonable depreciation used in fixing prices, together with the degree of peacetime usefulness and the cost of changes necessary to make the plant usable.

Sales should be made on a definite basis, with no consideration of future earnings, on reasonable down payment. The government should not advance funds for expansion or alteration of plants sold, nor subsidize the purchaser by means of lease or commitments regarding future purchase of products.

Future of Big Inch

With respect to the Big Inch pipe lines, the government under no circumstances should attempt to operate them, nor should any kind of artificial support or open or hidden subsidy be given to keep them in operation. Operated at combined total capacity of approximately 500,000 barrels daily, they would make idle some 60 T-2 type tankers representing a wartime investment of approximately $175 million, or some $35 million more than the pipe lines themselves. "Any apparent gain by keeping the lines in operation by artificial means for the transportation of oil will be more than offset in other directions by unemployment, by idleness of more costly equipment and by the lack of efficiency and flexibility of operation," Jacobsen contended.

Armed services: There is no conflict on any important point between the recommendations of the Army and Navy, PAW and the industry.

Independent company: Practically every one of the problems of independents goes back to the one question of price. A better price would enable the independent to increase his exploratory activities, prevent premature abandonment of stripper wells, permit the employment of secondary recovery methods in many fields. A major problem discussed only briefly is the fear prevalent in many quarters in the industry that the FPC, by a flank attack, will seek direct or indirect control of oil production.

"It is feared that FPC may ask Congress for extension of its authority to include control at the well of the gas which is produced along with oil," Jacobsen explained. "If this authority were granted to the commission, it would in

France Getting Its Wells Back Into Production

More than 600 of the 5000 wells in the earliest known oil field in France are again in production, it was reported last week by National Geographic Society.

The wells, which were reduced to an unworkable condition by the French in their retreat before the Germans during the war, are in the Pechelbronn field in Alsace, where oil was discovered in 1498. Exploitation of the field was undertaken in 1735 by mining of the sand, but when oil flooded the deepening shafts some 60 years ago, drilling was introduced.

The total output from the field has been estimated at less than 20 million barrels in its two centuries of operation with output prior to the war about 500,000 barrels a year, or less than one percent of French needs. Refineries at Pechelbronn were sufficient to process the total output, piped in from the field, and in addition were refining approximately 35,000 barrels of imported oil early.

The French government obtained possession of the deposits by the Treaty of Versailles and leased the rights to an operating company. Many of the installations were wrecked by bombing during the war, and others became useless because of corrosion.

effect control the production of oil. If the commission should seek such extension of control in any form, the oil industry hopes that Congress will strongly sustain the principle that this subject is a matter solely under state jurisdiction."

National oil policy: Should follow the program laid down by the National Oil Policy Committee, based on the experience of the industry, with due regard for the fact that "any important change in national policy which would cause a disruption in this continuity, and above all which would cause a serious diminution in the exploratory effort could have most serious consequences for our security in the unhappy event of another emergency."

The final sessions were marked by a charge that the major companies are putting a squeeze on independent marketers and a defense by farm cooperative representatives against charges by B. A. Hardey, president of Independent Petroleum Association of America, that they are rapidly assuming a major position in the oil industry.

Squeeze Is Charged

The charge of a squeeze was made by Eugene M. Callis, president of The Petrol Corporation, Philadelphia, who declared that "discriminatory and unfair practices" had all but forced his company out of business.

Unless Congress moves to curb these practices, he asserted, "there will be no genuinely independent companies in a position to offer real and effective competition to the major oil companies after the reconversion period."

The charges were denied by major company officials, with Carl Kieser of Socony-Vacuum Oil Company telling the committee that Petrol has made an "astonishing" record which refutes the charge it has to operate in a bad economic climate.

Eight farm cooperatives are engaged in integrated oil operations, it was testified by F. R. Olmsted of Kansas City, attorney for Consumers Cooperative Association. Consumers is the largest operator in the group, with three refineries owned outright and an interest in a fourth and some 400 producing wells in Kansas, Okahoma, Texas and Illinois.

Olmsted said the eight co-ops have a total of eleven refineries and anywhere up to 800 wells, and in 1945 produced 1,645,314 barrels of crude. However, he added, they purchased 10,939,415 barrels of crude from independent producers and 8,901,835 barrels from major companies in the same year.

Olmsted attacked the National Tax Equality League, which he said had conducted a propaganda campaign among oil and other industrialists, but was prevented from going into the matter by Chairman O'Mahoney, who said the league was not involved in the subject of oil operations.

The co-op representative asserted that sales are "primarily" only to farmer members and those to non-members purely "incidental," asserting that the state laws prohibited co-ops from transacting more than 50 per cent of their business with non-members.

Olmsted said Consumers was forced first, into the wholesale business by the refusal of distributors to sell to it and later into production and refining because of similar resistance by primary producers.

Under questioning by Senator Edward H. Moore of Oklahoma he insisted that the tax advantages which cooperatives are commonly believed to enjoy over corporations are merely "so-called advantages," but finally admitted they are not subject to the double taxation applied to corporate profits.

Disclosing the extent of co-op production and refining, he said "the farmers cooperatives engaged in the oil business are peanuts" and the oil industry "is not confronted with any problem so far as cooperatives are concerned."

Questioned about possibilities the co-ops will go into the foreign field, Olmsted said there has been no action in that direction, but admitted the situation is being closely watched.

"We feel in our organization that the integration of our business is vitally necessary to its preservation," he explained. "If the majors and independents move into foreign production, if the cooperatives are to exist they, too, must move into the same field. Otherwise they will find some day that foreign oil comes in here at a lower price for everybody except the cooperatives."

Olmsted pointed out that co-ops are taxed upon sales to non-members and said such sales were not sought. However, he said, when the refineries find themselves with a surplus of product it is sold to others who, in accordance with the law under which his organization operates, are given the same refunds as members.

Alfred A. Kiltz of the Indiana Farm Bureau, another integrated operator, said his organization has no retail outlets and all of the product handled is delivered by tank wagon to farmer members.

The Indiana organization, he testified, has advanced independent operators $312,000 in bottom-hole money in the past three years and in the past 18 months has loaned operators $349,000 together with large quantities of casing and equipment from its own stocks. It has never been necessary to foreclose on an independent operator, Kiltz said.

Demand to Gain Until 1950, Socony-Vacuum Man States

Demands for petroleum products will be 10 percent greater this year than in 1941, A. J. McIntosh, economist for Socony-Vacuum Oil Company, said March 26. The trend will continue upward at the rate of 3 percent a year until 1950 and then a recession in the nation's general economy will affect the volume of oil consumption, he thought.

Demand for gasoline by passenger cars during 1946 may be slightly less than in 1941, McIntosh said, but total gasoline demand is expected to equal 1941. This year's fuel oil sales, he predicted, will show a great increase over 1941. He predicted there will be 3,750,000 home burners in use in this country by 1950 "which should result in double the amount of heating oil being used then than was used in 1939."

United States petroleum exports this year will reach 595,000 barrels daily, said McIntosh, but this volume will decline in following years as refineries are built abroad. Exports in 1941 totaled 305,000 barrels daily and in 1939 they totaled 517,000 barrels daily.

The petroleum industry, he computed, is making a net profit of one cent a gallon domestically on its complete operation—exploration, producing, transporting, manufacturing, and marketing. The postwar earning rate for all companies, he estimates, will drop only from 7.3 percent to between 6 and 7 percent on investment.

Says Refiners Soon Must Use Lighter Hydrocarbons

The use of light hydrocarbons for refinery raw material was urged by E. O. Thompson, member of the Texas Railroad Commission, before the annual meeting of the Western Petroleum Refiners Association last week in Fort Worth.

"My purpose will be served if refiners are informed that utilization of a billion cubic feet of natural gas being flared daily in Texas soon will be required. This means a very great amount of light hydrocarbons are to be available to you and perhaps less crude.

"The Railroad Commission is determined to do its full duty in stopping flares of casinghead gas. These gases will furnish more and more of your raw material.

"Public opinion and good morale and science will demand that the products of conservation, which these materials are and which the greatly enlarged quantity will be, should be used first in making motor fuels and that the crude oil in the reservoir shall be brought forth only in sufficient quantities to make up the difference.

Alternate Course

"Either this or full proration of all the base materials shall be the order of the day, taking the supply of all into consideration so that there shall be no physical waste or production in excess of market demand."

The association adopted a resolution seeking early ending of price controls in oil. Robert Ash, chairman of the tax commission of the District of Columbia, reported there is no hope for tax reduction this year.

H. T. Ashton, general manager, Lubrite Division, Socony-Vacuum Oil Company, St. Louis, was elected president. He succeeds C. L. Henderson, Vickers Petroleum Company, Wichita, Kansas. T. A. Helling, El Dorado Refining Company, El Dorado, Kansas, was elected vice president to succeed H. E. Zoller, Derby Oil Company, Wichita. Vice presidents reelected are: R. W. McDowell, Mid-Continent Petroleum Corporation, Tulsa; T. M. Martin, Lion Oil Company, El Dorado, Arkansas; R. L. Tollett, Cosden Petroleum Corporation, Big Spring. John C. Day, Tulsa, was reelected secretary.

$50 Million to Conserve 250 Million Feet Daily Flared Gas in West Texas

West Texas and Panhandle operators have revealed a proposed expenditure of more than $50 million for conservation and economic utilization of approximately 250 million cubic feet daily of flared casinghead gasoline.

The program, which will involve construction of casinghead gas gathering and transmission lines, natural gasoline, and pressure maintenance plants, was discussed by operators March 28 in Midland before the Texas Railroad Commission. The proposed expenditure and volume of gas to be handled in District 8, constitutes the largest program announced for a single Railroad Commission district, although a number of similar programs have been announced for other areas throughout the state.

A substantial portion of the 250 million cubic feet daily of casinghead gas flared will supply El Paso Natural Gas Company's projected 26-inch gas transmission line to California, while authorized natural gasoline and pressure maintenance plants will materially reduce the waste in some of the major fields.

Shell's Keystone Plant

Confirmed projects involve an installation of a combination natural gasoline and repressuring plant to process 75 million feet of gas daily in the Keystone field. Site has been purchased by Shell Oil Company and associates for the erection of a 30 million-foot capacity plant in the TXL field, Ector County. A combination plant for the Block 31 field, Crane County, is under consideration by Atlantic Refining Company, operators in the Slaughter field, which embraces in excess of 70,000 productive acres with flare gas currently estimated at 43 million feet daily, have been at work in perfecting plans for the erection of a field-wide natural gasoline and pressure maintenance plant.

V. E. Cottingham, chairman of the North Basin Pools Engineering Committee, stated that the Slaughter field project under consideration would cost about $20 million, including some $5 million for the required dual pipe line system needed to gather and re-distribute the gas.

Spokesmen for Stanolind Oil & Gas Company testified that the company has authorized, or is considering the expenditure of about $25 million for the installation of pressure maintenance plants and gas marketing units in the Hutchinson County sector of the Panhandle and 8 areas in West Texas. One of the largest units would be a $7 million installation in the Goldsmith field, Ector County. Preliminary tests have been made for a pressure maintenance plant in the Cedar Lake field, Gaines County. Other projects involve its holdings in the North and South Cowden, Foster, Hendrick, Fullerton and Slaughter fields.

Gulf Oil Corporation's chief production engineer for the Fort Worth division, testified that the company has undertaken pressure maintenance surveys of its entire West Texas holdings, and that additional installations were under consideration.

The hearing was conducted by Commissioners Ernest O. Thompson and Beauford Jester.

Advance Orders Asked for Petroleum Resources Book

"New Sources of Petroleum in the United States" is the subject of a volume of hearings of the O'Mahoney Senate Special Committee Investigating Petroleum Resources which will go to press shortly. It contains committee proceedings June 19 to 25, 1945, when experts from both the industry and government presented information on occurrence of petroleum in the U. S. Copies at 75 cents each may be had by addressing the Superintendent of Documents, U. S. Government Printing Office, Washington, D.C.

Crude Oil Production in the United States

(Estimates compiled by the OIL WEEKLY
All figures indicate daily averages in barrels.)

STATE OR DISTRICT	PRODUCTION IN WEEK ENDED March 30	March 23
Alabama	1,000	1,000
Arkansas	77,200	77,100
California	861,300	847,800
Colorado	24,850	25,600
Florida	100	100
Illinois	208,600	208,600
Indiana	17,850	18,000
Kansas	259,400	259,400
Kentucky	31,700	31,750
Louisiana	375,850	375,850
North Louisiana	82,500	82,500
South Louisiana	293,350	293,350
Michigan	44,200	44,100
Mississippi	55,250	55,250
Missouri	100	100
Montana	19,950	19,900
Nebraska	750	800
New Mexico	96,750	97,000
New York	13,200	13,950
Ohio	6,950	7,350
Oklahoma	367,500	367,500
Pennsylvania	36,150	35,150
Tennessee	35	35
Texas	1,817,450	1,817,450
Upper Gulf Coast	418,850	418,850
East Texas Field	317,350	317,350
Rest of Eastern Texas	127,500	127,500
Southwest Texas	290,250	290,250
West Texas	436,500	436,500
North Texas	146,000	146,000
Panhandle	81,000	81,000
West Virginia	7,800	8,300
Wyoming	109,500	105,500
Total United States	4,433,435	4,417,585

Total stocks, foreign and domestic, March 23, as reported by the Bureau of Mines were 225,153,000 barrels with a daily average production of 4,431,000 and runs to stills 4,683,000.

Texas Body Disinclined to Increase State Allowables

A majority of the Texas Railroad Commission last week refused to raise Texas allowables in response to a telegram from the United States Navy. The Navy urged that it needed 130,000 barrels more fuel oil daily.

Commissioner Ernest O. Thompson became persuaded while in Washington that an increase was necessary and he asked that an order be prepared effective immediately increasing Texas allowables 200,000 barrels daily.

The same arguments and viewpoint were presented to the commission at Midland, Texas, by Navy officers and War Shipping Administration representatives, but Chairman Olin Culberson and Commissioner Beauford Jester plainly showed that they favored no further production increase until an adequate price increase is granted and OPA regulations are removed.

The Navy represented itself as being desperate but Jester said it was no fault of Texas producers or the commission that such a condition prevailed.

Jester pointed to high stocks of all oils on hand and thought the purpose of the move was to permit major purchasers to fill their tanks with crude and products. If the storage was full, he said, then there would be no need for any price increase in crude when, and if OPA lifts its control.

Independents Opposed

Jester had numerous telegrams from independent producers urging that no increase be allowed.

Culberson's prepared statement said the commission had invited witnesses to the last statewide hearing for the purpose of proving the Navy need but none had appeared. He thought that "a return to the purchase of fuel oils on a gravity basis by the Navy" would see an immediate change in the picture.

"Until persuasive, competent, and more tangible evidence is produced before this Commission, I see no reason to make any change in the present situation," the chairman said. "I cannot persuade myself that Texas resources and Texas producers should be called on to further sacrifice their reserves without adequate compensation therefor."

January Daily Average Imports Sets New High

January imports of crude oil and refined products totaled 12,806,000 barrels, an increase of almost 25 percent over the 9,919,000 barrels imported in December, the Department of Commerce reported. The daily average of 413,000 barrels was the highest ever recorded.

Crude oil imports totaled 8,302,000 barrels, or 268,000 barrels per day, and refined products amounted to 4,504,000 barrels, or 145 barrels daily, the figures showed. Refined receipts included 3,878,000 barrels of residual fuel oil, 581,000 barrels of distillate fuel oil, and 45,000 barrels of asphalt.

Declare Big Inch Lines Better Used For Gas Than Be Government-Operated

Although the oil industry would be the principal loser of sales, it is infinitely better that the Big Inch pipe lines be converted to natural gas use than to have them operated by the government, the Special Senate Petroleum Committee was told last week by the industry committee on postwar disposal of government oil facilities.

Signed by B. I. Graves, chairman of the subcommittee on pipe lines, a supplemental report filed with Senator Joseph C. O'Mahoney of Wyoming held that the disposal policies recommended by the Surplus Property Administration January 14 (THE OIL WEEKLY, Jan. 21) are "unsound and not in the public interest" and reiterated its suggestion made last November that the lines either be converted to natural gas or held in stand-by condition against a future emergency.

The report called on Congress "immediately to reassure" the country that the government will not be permitted to engage in business by operating the lines, as called for by the SPA, if they cannot be advantageously disposed of.

"It is inconceivable how a government agency charged with a responsibility and vested with an authority of such magnitude as SPA and operating under a mandate of Congress which demands preservation of the free enterprise system, could even suggest a course so utterly antagonistic to our American way of life," it declared.

Full Load Questioned

The industry report pointed to deficiencies in the SPA recommendation for government operation, citing among other things that it assumes that a substantially full load volume will be available for the lines and ignores the industry's own adequate tanker and pipe line facilities.

"The load necessary to provide economic operation of the lines cannot be obtained and maintained," which view would be "entirely substantiated if you will canvass those owners and shippers of crude oil who would have enough Texas-East Coast business to make the operation of the lines possible as carriers of petroleum," it said.

Another SPA recommendation, that the lines be used for interior service if they cannot be used for Gulf-Seaboard transportation, also was attacked because it would make industry-owned facilities idle and would disrupt established economic relations, possibly to the extent where many individual units in the industry might be destroyed.

All things considered, it was held, conversion of the lines to natural gas would be the "most desirable and least disturbing" disposition.

Asserting that this was not a "self-serving recommendation" but a sincere effort to assist the government in disposing of the lines to the best advantage, the report explained that "the oil industry would be the one principally affected so far as loss of product sales is concerned" by the conversion.

The subcommittee charged that not only did the SPA ignore the intensive study made for RFC by Ford, Bacon & Davis which concluded that the lines could best be used for gas (THE OIL WEEKLY, Dec. 24), but that its suggestion that to keep them in oil service would be the best method of preserving them for a future emergency was erroneous.

Would Not Keep Capacity

From the standpoint of the national security, it was contended, use of the lines for gas would be more practical than "turning them over" to compete with and destroy other oil pipe line capacity.

"The net result would be to reduce the total overland transportation facilities by approximately the capacity of the Big Inch lines, so that instead of preserving this extra capacity for another emergency, we would have done just the opposite," the report explained.

The subcommittee, headed by B. I. Graves, vice president of Tide Water Associated Oil Company, includes Clark H. Kountz, C. R. Musgrave, J. French Robinson, Sidney A. Swensrud, T. E. Swigart, Paul G. Blazer, E. Buddrus, A. L. Christy, Fayette B. Dow and W. R. Finney.

New Officers, Southern Gas Association

Dean A. Strickland, general sales manager of United Gas Corporation, Houston, was elected president of the Southern Gas Association at the 35th annual convention held in Galveston, Texas. Strickland succeeds Frank S. Kelly, Jr., Arkansas-Louisiana Gas Company, Shreveport, La. Other officers elected for 1946 include, above, left to right: Front row—second vice president, W. H. Ligon, Nashville Gas and Heating Company, Nashville, Tenn.; President Strickland; first vice president, W. L. Woodward, Zenith Gas System, Alva, Okla. Second row, directors—R. O. Wheeler, Gulf States Utilities Company, Baton Rouge, La.; Seward Abbott, Servel, Inc., Dallas; F. J. Evans, F. J. Evans Engineering Company, Birmingham, Ala.; and W. A. Green, Arkansas Public Service Company, Jonesboro, Ark. Rear row, directors—H. N. Oldman, Southern Gas Company, Carlsbad, New Mex.; J. H. Satterwhite, Westcott and Gries, Inc., Tulsa; D. W. Reeves, Oklahoma Natural Gas Company, Tulsa, and L. L. Baxter, Arkansas Western Gas Company, Fort Smith, Ark.

Not shown are: Treasurer, L. L. Dyer, Lone Star Gas Company, Dallas; directors, S. L. Drumm, New Orleans Public Service Company; W. F. Wright, Lone Star Gas Company, Dallas; J. N. Greene, Alabama Gas Company, Birmingham; and Norman Hirschfield, Consolidated Gas Utilities Corporation, Oklahoma City.

Synthetic Liquid Fuels Board

Appointment of a synthetic liquid fuels technical advisory committee was announced last week by Dr. R. R. Sayers, director of the Bureau of Mines. The committee will meet soon and thereafter will meet periodically, every few months.

Seven of the eleven members of the group were selected from the oil industry—Eugene Ayres, staff chemist on process development for Gulf Research and Development Company, Pittsburgh; H. W. Field, assistant manager of research and development, The Atlantic Refining Company, Philadelphia; Dr. Louis S. Kassel, research engineer, Universal Oil Products Company, Chicago; P. C. Keith, president, Hydrocarbons Research, Inc., New York; L. C. Kemp, Jr., director of research, The Texas Company, New York; E. V. Murphree, vice president in charge of research and development, Standard Oil Development Company, New York; and J. K. Roberts, director of research, Standard Oil Company (Indiana), Chicago.

Geotechniques OF OIL EXPLORATION

By DR. JOHN W. MERRITT
Geologist and Geotechnologist

OIL is a mineral which is by its very nature secretive. When it is found at the surface of the earth its exposure in that accessible position causes the loss of many of its most valuable properties. It is a liquid and hence may move freely from place to place unless conditions combine to entrap it. A trap suitable to hold a deposit of oil or gas in the formations of the earth and at the same time making it accessible and recoverable by man is essentially simple in principle. It must be made up of a rock body sufficiently porous to permit withdrawal of the oil or gas in commercial quantities and at an economically possible rate.

A sound application of natural laws is still necessary to successful exploration for oil

For the oil to be recoverable through a drill hole it must be contained in its reservoir together with sufficient dissolved gas to cause it to flow into the drill hole whence it can be brought to the surface by flowing, pumping or other means, or it must have some other driving force behind it. In most cases oil and gas occur in strata which also contain water under hydrostatic head. The water lies beneath the oil because of their differences in specific gravity, and the hydrostatic pressure on the water causes it to drive the oil ahead of it into the drill hole. At the end of the process the oil is entirely replaced

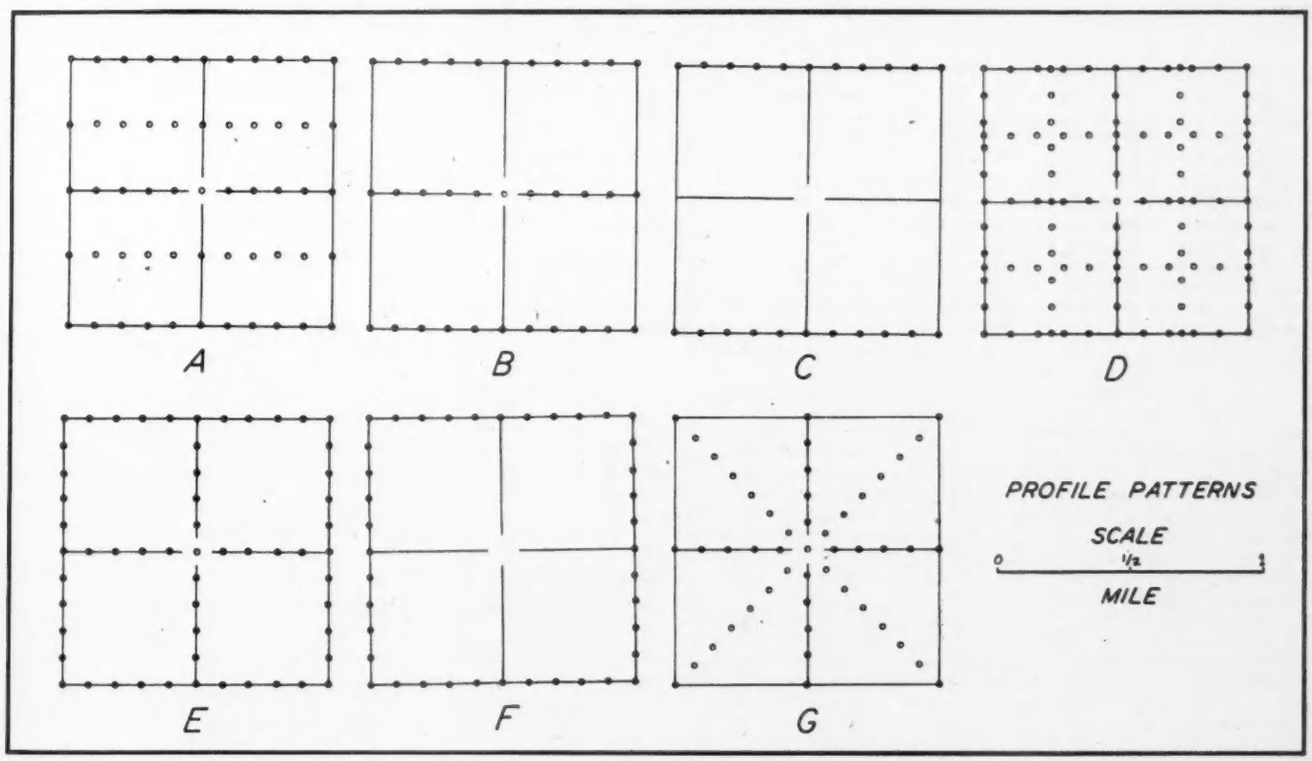

FIGURE 1

A. Quarter-mile parallel profiles, ten points to the mile. A single square mile will contain 55 control points. This sort of pattern is fairly good unless anomalies run parallel with the profiles.

B. Half-mile parallel profiles, ten points to the mile. This pattern contains 33 points per single square mile. There is not enough control to be certain how anomalous points in one line may be related to those in the other lines.

C. One-mile parallel profiles, ten points to the mile. A single square mile of this pattern contains 22 control points. A few accidental "highs" in an area sampled in this pattern, or, conversely, a few "misses" in the anomaly pattern makes the map extremely difficult if not impossible to interpret.

D. Quarter-mile crossed profiles, ten points to the mile. A single square mile of this pattern will contain 101 control points. There are areas of 40 acres with no central point of information. Otherwise the sampling is excessive, and, hence, costly.

E. Half-mile crossed profiles, ten points to the mile. A single square mile of this pattern contains 57 control points. It is a much less satisfactory pattern than D, because it has 160-acre squares devoid of inside data. Carrying anomaly patterns across a half mile of distance is hazardous to say the least.

F. One-mile crossed profile, ten points to the mile. A single square mile of this sample pattern contains 40 points of control and it is most unsatisfactory in view of variables encountered in the field.

G. Radiating profiles, ten points to the mile. A single square mile of this pattern contains 49 control points. This gives good control at the center and poorer control the farther the lines reach from the center. Assuming the center to be placed near the center of the supposed productive area, the good control is where it is least needed. It is a costly method of surveying.

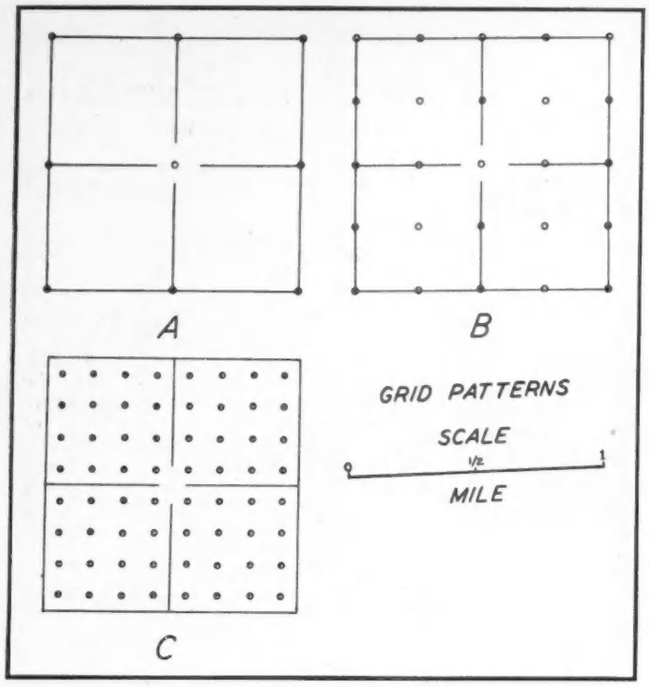

FIGURE 2

A. 160-acre corner pattern. This pattern contains in a single square mile 9 control points. There is not nearly enough control even for good reconnaissance work.

B. 40-acre corner pattern. This pattern contains within a single square mile 25 points. This will do for loose reconnaissance methods, but a better plan is suggested below.

C. 10-acre center pattern. A single square mile of this pattern contains 64 control points. This is an excellent pattern for detail work in all but a few cases where the productive area is very narrow (shoestring type) or where overlapping productive beds on "shore lines" make for complications or where close faulting occurs requiring close work. For such types of exploration 2.5-acre sampling is necessary. Also in some localities where the productive areas cover only 40 or 50 acres, the anomaly bands often are less than 660 feet across.

Reconnaissance work to test out a suspected area for anomalies is best carried out by running a 10-acre grid profile band across the short axis of the suspected area, using four rows of control points making a half-mile cross profile band. The advantage of this type of work lies in the fact that an anomaly appearing at one point is apt to be matched by one in the adjoining points, and the trend of the anomaly band may thus be disclosed as a guide to future work. Also, an accidental "high" or "low" may be set aside if not supported by surrounding evidence.

by the water, and the production of oil ceases.

Blindfolded Search

Because oil bodies must be held in sealed reservoirs, it is rarely ever that plain evidence of its presence appears at the surface. For this reason the seeker for oil must work blindfolded. In other words, the oil prospector must be guided by other methods of exploration than the use of his sight. Though in the first stages of oil exploration the operator followed traces of oil in the form of seepages, probably from shallower exposed or partially exposed beds, these "leads" were soon found to be as often misleading as revealing. Thus the operator learned that he could not depend upon test wells drilled adjacent to these phenomena because, while surface evidences of the presence of oil and gas indicate that there may be subsurface deposits in the neighborhood, it does not follow that such deposits lie immediately beneath or adjacent on one side or the other. Because of the early failure of such crude methods of direct exploration scientists began to seek improvement in exploration technique. It was not long, therefore, before geologists, studying the occurrence of oil in place, brought forth the anticlinal theory. Thenceforth oil exploration methods were revolutionized and a whole series of indirect methods of exploration sprang up, all based upon the anticlinal theory of the occurrence of oil and gas.

After a few years the largest and most obvious surface structural features in the known petroliferous regions of this country were discovered and tested, and only a few more worthwhile prospects remained to be drilled. About this time some large stratigraphic traps were found productive. One such is the East Texas field, an area of tremendous size and potential production. It was missed by many of the companies drilling in that neighborhood because its character did not lend itself to indirect exploration methods. Immediately geologists began to wonder if similar traps might not occur through the oil regions and might not have been overlooked because of their peculiar nature. If so, perhaps most of our future reserves were apt to be in that category. Much conjecture and many published articles followed, suggesting areas in which geologic history indicated possible traps due to overlap of sedimentation.

As the larger and more obvious structures were discovered and developed compelling the seeker of new oil reserves to explore in areas where structural conditions were less obvious and much more complex; and with the growing importance of non-structural possibilities looming ahead, there is little wonder that the oil industry turned with increased interest to the task of developing some direct method of exploration. Before long several techniques in direct exploration were developed—all of them supposed to be related to oil in place rather than to structure. These various direct methods were warmly received by the oil industry, and a great flurry of exploration tests folowed, often with negative results. As a result of many failures, these methods lost favor even more rapidly. The operator naturally reasoned that if an exploration method actually were related to oil in place, how could it fail? As a result of this reasoning many operators lost faith in those methods. They condemned them instead of trying to find out the reason for the failures.

This sudden unreasoned change of front was most short-sighted. Instead of condemning such new work flatly, they should have laid the scientific facts in the laps of their geologists and suggested a complete study and correlation of all natural phenomena connected with oil and gas accumulation in the form of physical and chemical changes in overlying formations and their effect in developing physical, geological, chemical, radioactive, and electrical phenomena. If a sufficient number of well-qualified scientists (particularly geologists with proper background in chemistry and physics) had attacked this problem ten or more years ago, direct exploration methods as applied to oil would be far in advance of what they are today. Oil operators have expected too much of these direct methods. They have sought some simple instrument that will tell them, without equivocation that an area is either productive or dry. It is not as simple as that. There are several methods of direct exploration but there is not one but what requires between the question and the answer the solution of a problem in interpretation founded upon the sound application of natural laws based upon discovered facts in relation to natural phenomena. It is up to the geologist and engineer, therefore, to familiarize himself with all the basic phenomena and their interrelationships. It is the purpose of this paper, therefore, to enumerate and describe briefly most of the direct and indirect methods of exploration and the natural phenomena attending their use, and to show how all of these methods of exploration interlock with one other through the same natural phenomena, just as medical symptoms relating to one certain malady are interrelated.

Various Exploration Methods

Indirect Methods: After the early operators found that drilling in the neighborhood of oil or gas surface showings was more or less futile, they began to seek more effective methods of exploration. By this time they found that when they failed to get oil in a known producing sand they usually got water. They also found that the productive wells were high on folding or structure and the water wells were low. Geologists immediately began to put these facts together and they brought forth the anticlinal theory of oil or gas production, i. e. a theory based upon the fact that most oil-bearing sands also carry salt water and that the oil, being lighter than the water, floats to the top of anticlines or domes and is held there in place (entrapped) by the underlying water. Albeit that the oil or gas is held in such traps as anticlines by water

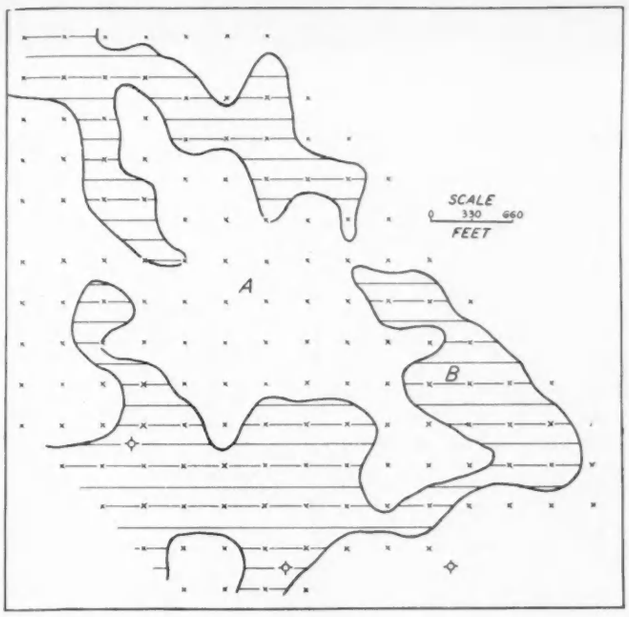

FIGURE 3

Figure 3 is a geochemical map of a small area with close spaced sampling. The samples were collected on a grid pattern at 330-foot intervals. It will be observed that the marginal anomaly band is not perfectly closed but the pattern is unmistakable. It will also be noted that the marginal anomaly band (shaded areas) is less than 660 feet wide in many places. If a 660-foot pattern had been used, this marginal anomaly would not have been discerned. Area A is the favorable area and Area B the marginal anomaly. It will be noted that the marginal anomaly is broken at two points but this condition exists in most surface geochemical work. Likewise, there are a number of extreme "highs" in the anomaly area with lower points between.

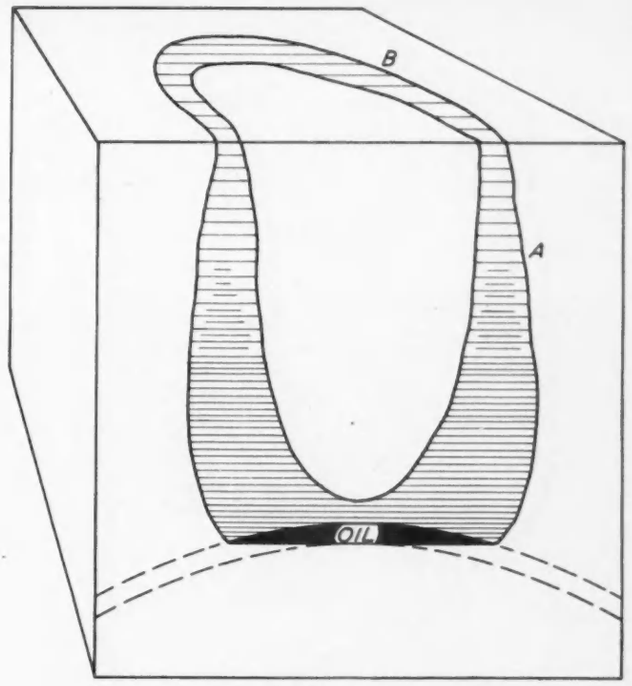

FIGURE 4
Simple Dome

Figure 4 shows the relationship between surface and sub-surface geochemical patterns and the producing oil horizon from which these patterns orginate. The shaded areas indicate the zone in which most of the escaping hydrocarbons are concentrated. Because of the ability of hydrocarbon gases to evaporate water this will also be the approximate zone of concentration of water-soluable compounds. In this zone, or adjacent to it, will also occur any heavy hydrocarbons or waxes which may be formed by polymerization of the lighter molecules. A marks the sub-surface zone of hydrocarbon movement and B marks the area of escape of hydrocarbons from the surface.

As the oil accumulates the first ecsaping hydrocarbons will rise from the center of the top of the oil trap. As the chemical nature of the strata above the oil is altered organically and inorganically, with a clogged effect, zone A will tend to expand laterally around the clogged area. Thus the inner portion of the sub-surface hydrocarbon zone will be filled and lined by concentrated organic and inorganic compounds. This mineratl concentration, however, tends to coincide with the hydrocarbon surface zone B.

occurring in the same formation, operators soon found that it does not necessarily follow that all such traps contain oil or gas. The percentage of discoveries drilled "on structure" was better in the early days of oil exploration than it is now, and that percentage was high enough to make geologically based exploration pay far better than haphazard drilling. This fact made "geology" grow in favor with great rapidity. The early geological work was done almost by seeking closed anticlines or domes where the same could be mapped on formations exposed at the surface.

Surface mapping went on as long as there was plenty of country available in oil-bearing regions, with abundant exposures of mapable horizons. In those early days no geologist would consider reporting favorably on anything less than a perfectly closed dome. This condition continued while exploration swept westward across West Virginia, Ohio, Indiana, Illinois and jumped to Kansas, Oklahoma and the "hard rock" parts of Texas. But after these states were covered wherever surface mapping was relatively simple and easy, the percentage of producing "structures" declined and exploration costs climbed. The oil operator was faced with the necessity of some new form of pioneering. He had to pioneer to greater depth on structures already known and he had to explore the possibilities of the poorer types of structure. With the attendant lowering of production averages he had to find some other way of discovering structures in the top class of prospects. He had to discover some other method of mapping structures up to now not visible or discoverable. One of the first steps in seeking such hidden structures was to work sub-surface geological structures by means of well records (where available) and the additional use of core holes drilled to recognizable buried horizons. Sub-surface mapping went well as long as the core holes did not have to be drilled to a depth that made the cost of exploration prohibitive. But before long shallow "markers" became exhausted in many areas and deeper core drilling too expensive when measured in results.

Enter the Seismograph

It was not long, therefore, before the oil industry was forced to seek another means. It was then that the seismograph, the gravity meter, and the torsion balance were brought into use. As is well known, the seismograph is designed to record earth tremors. It was designed for the purpose of locating the depth, distance and direction of earthquakes. From that beginning oil engineers developed a seismograph machine sufficiently refined to record much smaller shocks. By using this instrument with small explosive charges set off near the surface of the ground, the time it takes the sound wave from the detonation to penetrate into the earth and rebound from harder beds below is recorded. After calibrating the speed of the sound wave for any given locality and group of formations, in order to determine the structure of such "markers," it is necessary to make allowance for surface elevations at shot holes and recording instruments. Where suitable markers are deep the seismograph method is much cheaper and more satisfactory than widely scattered core drill holes.

Another structure-mapping method by geophysical means is based upon the use of the gravity meter. This instrument measures variations in direction and intensity of the force of gravity. By properly placing this instrument and by recording and correlating the gravitational changes, it is possible to discover structural uplifts, however deeply buried they be.

Another instrument which a few years ago was widely used, is the magnetometer. This instrument measures the intensity of the earth's magnetic field. Where beds containing an abnormal or subnormal amount of magnetic material are buried and are brought closer to the surface by uplift, such uplifts can be detected. The difficulty in the use of magnetometric information comes from the fact that sometimes it records a "low intensity" over uplifts while in as many cases it records the reverse. Thus one must drill both anomalies to be sure which of the two indicate favorable structure.

Direct Methods: Before taking up the

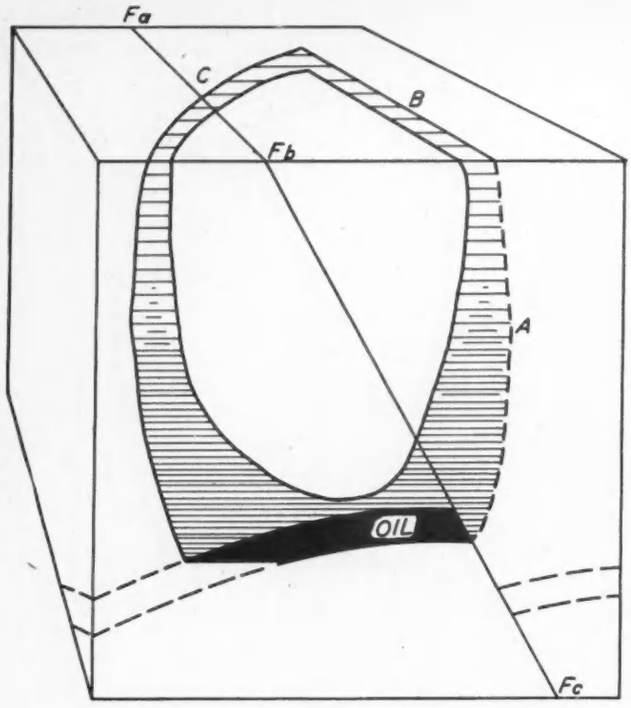

FIGURE 5
Fault-closed anticline

This diagram shows the hydrocarbon pattern above oil production in three dimensions. It depicts a plunging anticline closed by a fault. The surface trace of the fault is shown by the line Fa-Fb and the cross section of the fault is shown by the line Fb-Fc. The sub-surface hydrocarbon pattern is shown by the shaded area A. The surface hydrocarbon anomaly marking the fault is the straight-line band B. The curved band C is the anomaly marking the water edge of production.

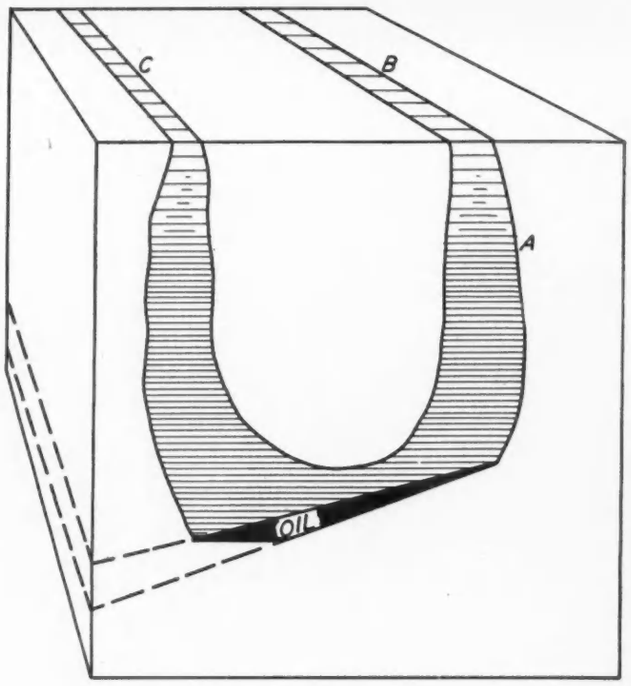

FIGURE 6
Stratigraphic trap

This figure illustrates the geochemical phenomena related to production held by a trap formed by a "pinch-out" of the reservoir bed. Shaded area A is the sub-surface area of greatest hydrocarbon movement. Area B is the anomaly band marking the upper edge of the trap. Area C is the anomaly band marking the water edge of the trap.

more common direct methods of oil or gas exploration separately, it will be well to lay down a few premises which must be established before any of these direct methods of exploration can be accepted as being securely based. First, it is not necessary that some instrument be devised which, by some magic force or interattraction, may point to the oil. Second, it is not necessary that the device be able to tell depth, thickness of saturated horizon, or quality or quantity of oil. It is well enough if the oil body can be located. Given the location, extent, and shape of a buried oil or gas body, geologists familiar with the local stratigraphy can supply most of the remaining information. Frequently, from the pattern of the productive area, he can make a good guess at what horizon it may be expected to produce. It is not for the writer to say that no instrument will be invented which may take all deduction out of the problem, but, up to now the writer has not seen any instrument which can be set down by itself and which will do such work without the human touch.

Factors To Consider

These thoughts lead us to a number of conclusions. Before a direct oil and gas exploration method can be perfected the following factors must be considered. (1) That oil or gas must, by its very presence, make chemical or physical changes in the rocks or soils above it which can be determined by chemical, electrical or other physical means; (2) that these chemical or physical changes caused by and related to the presence of oil or gas must form patterns by which their location, form and significance may be interpreted; (3) that the location, form and other characteristics of these anomalies must make geologic sense, i. e. that these significant characters must not disagree with actual structural or stratisgraphic conditions known to exist in the areas under study; and (4) that deductive reasoning must be applied in making interpretations.

It is not known to the writer which of the more accepted direct methods of exploration was first used, but perhaps electrical methods were among the first. These methods fall into one main group: measurements of resistivity or relative conductivity made directly by contact methods, or indirectly, by induction methods. The equipment used for this work may vary from a simple storage battery equipped with electrodes to be pushed into the surface soil and a Wheatstone bridge for recording purposes, to more elaborate battery boxes with oscillators to change the direct current of the batteries so that the current used in the tests can be measured without the addition of or interference from the direct currents found in the soil itself. For induction or indirect methods short-wave sending devices may be set up over and around areas to be surveyed, and the conduction of these impulses studied. But electrical survey methods may range also from the low-powered equipment mentioned above to heavy equipment consisting of trucks with generators and with long lines of wire for placing electrodes at wide intervals and with more delicate and intricate recording devices. It was the original idea of most of the early operators and inventors of these electrical methods (particularly the resistivity methods) that the current injected into the ground was interfered with by the oil or gas bodies at depth, due to the resistivity of such oil or gas bodies. This reasoning is not now considered sound. There is no reason why the current should pass to great depth when it could more easily travel through the surface soil from sending to receiving electrode. Nevertheless, to the writer's knowledge, this method has proven effective.

Soil Analysis

Another direct method of exploration for oil and gas which began several years ago and which is now growing rapidly in use and acceptance, after earlier set-backs, is geochemistry, popularly called "soil analysis." The early shortcomings of this method were due in a large degree to the failure of geochemists to take into account fully the significance of geological factors which must be considered in making geochemical interpretations. After learning to meet geological conditions and after improving field and laboratory techniques, geochemists are growing more and more sure in their work and the oil industry is awakening to the possibilities of this method. Perhaps we should say methods instead of method, for there are wide divergences in laboratory and field methods as practiced by different geochemical operators.

First, there are two general divisions based upon the groups of compounds used in making analyses and interpretations: the hydrocarbon method and the non-hydrocarbon method. In the former, the geochemist analyzes for

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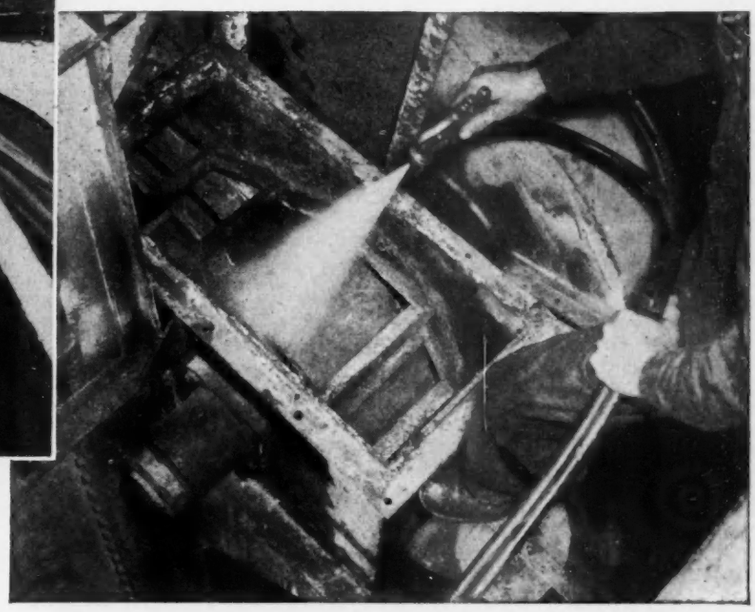

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various hydrocarbons to determine the quantity at various selected points and plots and interprets his density pattern. But here again there are divergencies in practice. Some analyze for the hydrocarbon gases, others for liquid hydrocarbons and others for waxes. Again, there are many different methods of making these quantitative analyses, such as gravimetric, volumetric, colorometric, spectroscopic and photometric (fluorescent). The second geochemical method, or the inorganic method, deals with inorganic compounds concentrated in the soil or bed rocks by reason of the passage of hydrocarbon gases through to the surface. In this method the operator may select one or more of the compounds which he may consider critical and find the quantity of such compounds in the sample by simple chemical methods or by any one of several electronic methods. The collection of samples in the various geochemical methods, moreover, also varies widely. Early operators exhausted the "soil-air" from the ground by pumping it out of holes and analyzing it for hydrocarbon contents. Other and later operators use charcoal or other collecting agents placed in cartridges and buried in the soil to collect soil gases for analysis. Still others collect the soil itself, analyzing weighed quantities of it for the desired compounds. For soil sampling, the practice varied from taking soil at the depth of a fraction of an inch to going as deep as 18 or 20 feet. The arrangement or pattern of samples also varies from profile lines with samples 500 or 600 feet apart in line, to the gridiron pattern with samples at varying distances apart from 200 to 300 feet to as much as ¼ mile or more.

In the case of profiles, the lines may be parallel and from ¼ mile to a mile apart, or they may be crossed profiles in rectangular pattern, or they may be in radiating form from a common center. No matter how much the geochemical methods may vary in field or laboratory technique, however, they all agree in principle and in the fundamental basis of interpretation. They are all founded upon the belief that hydrocarbons escape from oil and gas bodies upward through overlying rocks to the surface of the ground and, in this escape change the organic or inorganic chemistry of the surface soil to form a definite and interpretable geochemical surface pattern.

A most widespread group of elements found in surface soil is the group of radioactive elements found everywhere. Recent work in making density maps of radioactive intensity has demonstrated that such maps, properly made and interpreted, are very significant in their pattern as related to the presence of oil or gas beneath. Where radioactive patterns are developed above oil or gas production they closely resemble those made by mapping density of the various critical organic or inorganic compounds.

The possibility of making biological surveys, particularly bacteriological surveys, has also been mentioned by men well qualified to know their significance. Such surveys, of course, tie into the hydrocarbon pattern found in the surface soil.

Phenomena Related To Oil and Gas Accumulation

Phenomena causing oil and gas accumulation: In almost all cases oil or gas occur in water-bearing strata, with the water usually closely approaching the composition of the sea water in which the individual sediments and those immediately adjacent vertically were originally deposited, except where water has been diluted by infiltering rain or surface waters. Oil condensing in or being compressed into these water-bearing sediments is lighter than the water and, therefore, must rise to the upper part of the porous bed and against the impervious or less permeable roof bed. If this roof bed slopes, the oil or gas will follow up the slope until it is trapped by a change in the slope of the beds or by the termination of the porous bed. In the early days of oil and gas exploration it was thought that the only important oil or gas trap was the closed anticline or dome. To a geologist familiar with the many variations in structure of earth strata, however, the necessary components of a trap may be found in an astoundingly large variety of earth structures. For drawings of a large number of various oil and gas traps, the reader is referred to Bulletin of American Association of Petroleum Geologists, Vol. 29, No. 11, pp 1537-1580 published November, 1945. These natural traps for accumulation of oil or gas may be formed by compressive forces, by tension or by the processes of sedimentation. Or, again water solution or chemical changes such as dolomitization may play a part by creating pore space for the entrapment of oil or gas.

In considering the elements which make for oil or gas accumulation and the prevention of the migration of those substances, one generally considers the porous body as being sealed above and below by impermeable beds. These should be described, however, as *less* permeable rather than impermeable, for no earth formation is perfectly impermeable. If the beds entrapping oil or gas were impermeable, there would be no loss of the light hydrocarbons which bring about the various chemical and physical changes in the overlying formations, and most, if not all, of the direct methods now being used in oil exploration would have no basis for existence.

Phenomena caused by oil and gas accumulation: The most important geological facts which come to light in a thorough study of oil and gas in place and of the overlying formations are (1) that the formations overlying oil or gas deposits are permeable; (2) that certain of the light hydrocarbons escape from the parent body upward *through* the overlying beds; (3) that the escaping hydrocarbons move vertically regardless of the dip of the beds or of their relative porosity from bed to bed; (4) that this movement is in small quantities molecule by molecule rather than in flowage in great volume; (5) that these light hydrocarbons have the ability to pick up water vapor and transport it upward to the point of escape and (6) that the light hydrocarbons may be affected by radioactive substances and be polymerized into heavier hydrocarbons or even waxes. Upon the foregoing geological facts rests the entire structure of most if not all of the direct exploration method interpretations.

Geologists have been inclined to doubt the truth of some of the foregoing statements of fact. Their verity, however, has been proved by the examination of thousands of cuttings from wells located in all positions relative to production, from central wells to wells outside the limits of production. These examinations have shown the quantitative distribution of the various hydrocarbons in three dimensions as related to the position of the oil or gas bodies. Other examinations have also shown the water-load of these hydrocarbons at various points in the vertical column. Accompanying sketches show some of these relationships. Having established the factual truth of the presence, direction of movement and tri-dimensional pattern of the light hydrocarbons from the source to the point of escape, reasoning finds a logical relationship between those facts and certain geochemical, geo-electrical, biological or radioactive patterns discerned in surface formations above oil or gas areas, as well as certain physical or chemical features developed in the bed rocks between the oil and the surface of the ground.

Reference to the sketches showing hydrocarbon densities in cross section above an oil body will aid the reader to visualize the area of greatest hydrocarbon movements. If this be accepted as the zone of greatest hydrocarbon movements in escaping to the surface, it may also be considered as the zone of greatest evaporation by the hydrocarbons. Now, if evaporation is heavier in this zone than on either side, the water from this zone which is being carried away must naturally be replaced by gravity, or capillary action or both, by solutions from either side. But evaporation does not remove solid compounds held in solution. It follows, therefore, that compounds in solution in the rocks through which these gases pass, are concentrated in this gas zone by loss of water and replacement by solutions from either side. This concentration will take place both in the bed rocks above the oil and in the surface soils. Such concentration may take place until precipitation of some of the less soluble compounds takes place. When precipitation takes place the density of the bed rocks increases.

One effect of this concentration of solutions, sometimes to the point of precipitation, is to change the speed of sound waves through the affected zone. Another effect of this concentration is to increase the electrical conductivity of the rocks or soils in the gas-filled zone. Again if these solutions contain radioactive compounds, radioactive intensity should also be concentrated in the zone of gas movement. Furthermore, where greater amounts of gas are escaping through the surface soil, the effect of this increase in quantity of hydrocarbons may be observed by a study of the bacteria as to predominance of certain hydrocarbon-loving types. For some time geophysicists have noted false "highs" on the margins of low-dip domes containing oil or gas. The false high is due to increase in sound conductivity in sufficient quantity to overcome the low dip of the formations. For an even longer time geologists and chemists have noted increase in salinity in water sands above producing areas. But it is only now coming to light that all these phenomena are related to a common cause.

As has been stated, direct methods of oil and gas exploration are direct only in that they relate to oil and gas in place

■ CONTINUED ON PAGE 26

Plain Old Mud GOES MODERN!

Mud was once a rough-neck's grief,
A necessary drilling trouble,
Hosed off with water
From slippery pipe,
Mud was sloshed
On rig floors
and *Lost!!*

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And back into the hole
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Function and Use of Petroleum Engineering Committees

Part 2

By D. V. CARTER
Chief Petroleum Engineer, Magnolia Petroleum Company, Dallas

TAKE the case of Illinois with respect to the advantages to be gained from the operation of a statewide petroleum engineering committee similar to the one now operating in Mississippi.

Like several neighboring states, Illinois in the past nine years has experienced a revival of oil development and discovery. The discussions concerning the relative merits of proration, either arbitrary or scientific, in which factual data are utilized as compared with unrestricted production which is tantamount to the jungle law of capture, have been engaged in by operators and citizens alike to a greater or less degree. Another argument that has been employed by the proponents of unrestricted production is that of first supplying the state's petroleum needs or the needs of an area comprised of it and several neighboring states before any serious action is taken to put into effect any conservation measure which would curb well production rates either on the arbitrary or to some degree the scientific basis.

Let us also keep in mind the fact that any gesture toward regulation of withdrawal rates on an engineering or scientific basis would raise the question of economic utilization of oilwell gas, by far the most important source of gas remaining in this area. The encouragement and support that would have been given, would undoubtedly have been beneficial in helping to analyze and clarify many important problems, had a cooperative petroleum engineering organization been started on a statewide basis soon after the last wave of development in the state some eight or nine years ago. Some of the problems are profitable employment of solution gas in secondary recovery operations, well spacing, optimum production rate and desirability of air, gas and water injection. In any of the preceding instances, the factual data provided by a cooperative or unit plan would have been greatly beneficial. Instead, the law of capture prevailed, valuable natural reserves were tapped indiscriminately and waste resulted.

It is not the purpose of this address to explore the pros and cons of what to some is the controversial subject of proration and conservation. The point I wish to emphasize is that the availability of early and timely reservoir studies based on data of a scientific nature would have proved definitely helpful.

Cause And Effect

Despite the high drilling rate, and continued reworking of wells into additional pays, the annual production materially declined from the 1940 peak of 146 million barrels to 74 million barrels during 1945.

I believe that the production would have been sustained at a much higher rate had the reservoirs in many of the fields been analyzed early enough, and the necessary steps been taken by the owners to insure the maintenance of adequate reservoir pressure. In addition, such action would have undoubtedly insured a greater ultimate recovery. Such a course of action would have required a regional collection of technical data. Had this plan of operation been followed, it would have inured to the advantage of the operators, the tax gathering authorities and the nation.

As in many other states, much of the gas produced with crude oil has been wasted. Had the aforementioned plans of cooperation been inaugurated, such a waste would have been largely avoided.

Because of the decline in the discovery of new fields, the opportunity for obtaining data has diminished. For the same reason less opportunity exists to put into effect sound engineering practice during the primary stage of a field's life.

This situation does not prevent the petroleum engineering committee from being of great benefit in the future. If fully appreciated and utilized, the data collected by these committees can greatly increase the ultimate recovery of this state.

A cooperative engineering committee is a clearing house for data. As mentioned elsewhere, much of this material is of such a nature that it must be collected periodically.

The beginning of secondary recovery operations is dependent on a number of factors, not the least of which is the price of oil. We all know the crude oil prices must be at least sufficient to permit operation under secondary recovery with some margin of profit. Of course, for every advance in the price of crude oil, a new crop of properties are elevated from the marginal class. In a declining oil market, the reverse is true.

Illinois is cited in an example of waste that could have been prevented by a timely plan of cooperation

Some secondary recovery operation will almost always be profitable, regardless of the price of crude oil. Operations of this type will increase the ultimate recovery of profitable oil in your state. This desirable economic condition will foster, I am sure, a condition conducive to improved secondary recovery technique, which in turn will stimulate and promote the industry to more extensive exploration, both from a depth and geographic basis. Without question, this should result in the discovery of new oil and gas fields. The proper operation of such new fields should be a challenge. Engineering data are indispensable for the intelligent operation of any field.

Illinois is fortunate in having one of the best and most efficiently organized State Geological Surveys in the nation. The Illinois survey has laid the ground work in the collection of much of the needed data and the publishing of reports which are of inestimable value to the industry. However, the installation of a statewide cooperative petroleum engineering committee would complete and greatly enhance the work of the state survey.

A number of states besides Illinois are in a position to benefit greatly from a statewide engineering committee. The larger producing states have departments which maintain some sort of records, such as the Texas Railroad Commission, the Oklahoma Corporation Commission, and the Arkansas Oil and Gas Commission. The smaller producing states, especially those exhibiting the possibility of developing important hydrocarbon reserves, would do well to form engineering committees to permit the history of fields to be adequately recorded. The older producing states need comprehensive records to assist in secondary recovery activity which is gaining headway. An engineering committee in these states would take on partially the character of a research group with respect to ferreting out information of old fields.

Early Records Needed

Another group of states along the eastern seaboard and other parts of the United States, considered by many as "potential" producing states, could, if productive use this type of committee profitably. The ideal time to start records is when active developments begin, as was the case in Mississippi.

Please do not misconstrue. It is not my intention to tell you what you should or should not do, but to give you the benefit of our experience, and what can

be accomplished by this type of committee when the committee is wholeheartedly supported by all interested operators either on a field, area, or statewide basis. Obviously, the large-scale basis has more to offer in the way of completeness, economy and education.

It is not my intention to give the impression that the use of petroleum engineering committees on either a field, area or statewide basis will prove a panacea for all economic and operating ills with which you are familiar. They are not a blind nor do they cover any tricks unorthodox to the traditions of the industry or good business ethics. They are definitely not "Pollyanna-ish" in character. Rather, to make such a plan work requires the utmost patience and effort as well as a give and take attitude and ability to cooperate on the part of interested operators. Also, the royalty owner and state conservation board must support them with trust and forbearance. Too, engineers must also guard against prostitution of these committees for political, private or selfish motives. This method of gathering fundamental facts, data and statistics is absolutely necessary if we are to meet the requirements of good operation, thereby insuring maximum recovery with least waste. Above all, it is a way, or perhaps we should say it is the way, that will preserve our own democratic way of life and at the same time insure the individual initiative which is mainly responsible for our freely competitive petroleum industry position today.

It is your property. There is a moral obligation on the part of the owner to operate it efficiently. I suspect these properties represent an important part of your worldly possessions—used wisely, all will benefit. There is no excuse for unintelligent, inefficient or wasteful operation of such property.

Conclusions

I have attempted to give a resume of the cause leading to the creating of this type of committee; the function and use of this kind of committee; its legal aspects and scope and the advantages and benefits to be derived from such a committee.

The geographical scope is important and worthy of deep consideration when going into the desirability and feasibility of such a fact-producing committee. It is worth mentioning again that prestige, completeness and uniformity of reports, education and economy are some of the more important advantages of a statewide committee—such as the Mississippi Oil and Gas Engineering Committee. A committee operating on a widespread basis requires the best directing talent available. In this respect the Mississippi Oil and Gas Engineering Committee has been most fortunate in having Alec M. Crowell as the first and present director. The results obtained during the first year of operation have been most gratifying. Ideal relationships have existed between the Committee and the various state officials who are concerned with oil and gas matters as well as with the membership of the committee.

The factual data published for the use of the committee members hold a position of such importance and usefulness that it would be sorely missed should it be discontinued. The fact-producing petroleum engineering committees are truly democratic in nature and definitely anti-monopolistic in character. They encourage competition by providing factual data necessary for investigating all manner of possibilities. This often leads to discoveries of import, covering a wide range in geological, production, engineering, and economic fields. Actually, the smaller operator from the cost of data coverage standpoint is the gainer compared to larger operators who normally have information facilities which provide at least a part of the desired data.

I shall venture the prediction that committees for the purpose herein discussed will continue to be organized, and their usefulness will increase. The opportunity exists for some state oil and gas regulatory bodies to collect and publish adequate factual data. The Arkansas Oil and Gas Commission does publish such data, but in my opinion there is little likelihood in this occurring, for most of the states, for several good reasons.

I shall also predict that if factual data are not collected and utilized by the industry and state regulatory bodies in a sincere effort to win the maximum economic recovery of hydrocarbons, it would be an invitation for Federal Control or possibly worse. The experience with federal agencies, particularly their inability to furnish data in time to be of current use and value, should be in itself a further warning and incentive for the need of industry fact-finding committees as outlined herein. As stated above, operators have, I believe, a moral obligation to put into effect the very best operating methods permitted by existing economic conditions and engineering technique.

Therefore, it is hoped that operators will wholeheartedly consider, examine and support this type of committee where necessary, in any state, area or field embraced by their operations. They are an instrument which will afford the means through which the oil and gas industry can remain private in character and make still greater contributions than it has in the past.

The following is a memorandum to the writer from Walace Hawkins, general counsel for Magnolia Petroleum Company, on the Mississippi Oil and Gas Engineering Committee.

We have considered the Mississippi Oil and Gas Engineering Committee's proposed organization and activities. You inquire whether the anti-trust laws prohibit such organization and activities. We answer that they do not. This conclusion is based on the following statements:

The joint and cooperative activities proposed include a loose-knit, unincorporated, voluntary, fee membership, statistical committee. There will be some salaried agents. The activities pertain solely to professional and technical men and are confined to a statistical program. The committee will secure and determine engineering data relating to oil, condensate, gas and water production, reservoir pressures, oil and gas ratios, initial production, surface pressures, open and closed, periodic and cumulative production, and other similar factual data determined by the committee. Activities embrace the assembling and tabulating of such data periodically covering different leases and fields in Mississippi. The distribution and dissemination of such data are to members only and to the Mississippi Oil and Gas Board, a state statutory regulatory body concerned with such facts. Membership is not closed or restricted, but is extended to all eligible members. Dissemination of information by the committee is unaccompanied by comments, interpretations or suggestions. There is no agreement or understanding, expressed or implied, with respect to prospecting and production policy to be pursued, nor is there restriction on competition in oil and gas producing operations.

Although there may be doubt that the federal anti-trust law applies (see *Railroad Commission of Texas v. Rowan and Nichols,* 310 U. S. 570; *Burford v. Sun Oil Company,* 319 U. S. 315; *Parker v. Brown,* 317 U. S. 341; Connally Hot Oil Act! Federal Natural Gas Act), it is assumed that it may. Only a few adjudicated federal cases outline the permissible pattern for joint and cooperative statistical activities and programs.

Confidential Data

I see no illegality merely because the accumulated data are restricted to members and the state regulatory agency. It is confidential and is the result of professional attainments. There is no prohibited restraint, reasonable or unreasonable, in the joint and several holding of private property resulting from professional data. There are no joint comments, interpretations or suggestions with respect to future production policies. Past and current transactions as to producing operations only are embraced in the statistical program. Moreover, producing policies are subject to state regulation. While no statistical program has been condemned merely because transmission of data is accompanied by comments, advice and suggestions as to future action, I note you prohibit the committee or its members from making suggestions, comments and interpretations as to future producing policies. This avoids the appearance of evil that such interpretations, suggestions or comments in reality form an agreement as to producing policies. Oral discussions by the committee are contemplated at meetings. These discussions do not embrace future producing policies of members. Adequate and sufficient defense is available should such prohibited discussions creep into the committee meetings of these technical and professional men. The safety lies in the fact that such technical and professional men have no power and do not in fact determine, control or fix the producing policies of the operators. There are no committee recommendations as to production policies. There is no policing of any plan of production. There is no enforcement machinery to compel obedience to committee interpretations, suggestions or comments which relate to producing programs.

Other Groups Studied

We have heretofore examined similar engineering committee organizations and activities for the same purpose, such as the Goldsmith Pool Engineering Committee, North Basin Pool Engineering Committee, East Texas Associations, Yates Pool Operators, Lea County Engineering Committee, Conroe Engineering Committee, Fullerton Engineering Committee, West Edmond Engineering Committee, and many similar committees limited to unitized operations.

A statistical program of this type has

not been picked out as a device of monopolies in the pending antitrust case (*United States of American v. American Petroleum Institute*). Mr. Cook, in his monograph on "The Control of the Oil Industry by Major Oil Companies," based on testimony before the Temporary National Economic Committee, does not single out engineering committees as a method or device employed in the control of discovery, and production of oil and gas (Monograph 29, Government Printing Office, 1941). Mr. Pearce, who wrote Monograph 18, "Trade Association Survey," likewise based on the evidence taken by the Temporary National Economic Committee, shows the extent of such permissible statistical programs in the United States (Government Printing Office, 1941). Mr. Handler, who wrote Monograph 38 on "Study of the Construction and Enforcement of the Federal Antitrust Laws," based upon the same committee's hearings and testimony, sets out what he thinks is the test of a permissible statistical program (Government Printing Office, 1941). Your proposed organization activities meet his test.

Assuming that immunity from the federal antitrust law was available under Title 50, U. S. C. A., Section 12, under Recommendation 13, Petroleum Coordinator for National Defense, acting under Executive Order 9276, December 2, 1942, or other Petroleum Administration for War directives, it should not be sought for the cooperative and joint activities which you contemplate. The Mississippi statute giving immunity is probably broad enough to cover this. It should not be sought because there is no ground for illegality.

I should mention an irrelevant matter. The committee data should not be subject to court subpoena at the instance of third parties, public or private, nor even by members for the purposes of private litigation or for other purposes, running to and served upon committee personnel as such. The data you accumulate are and should be the private property of the members as operators. Committee members subpoenaed to testify should claim immunity based upon the ground that professional testimony is sought to be elicited and on the further ground that the necessary data from which to testify professionally are not the property of the witness but must be obtained from the individual members.

Acknowledgment

Acknowledgment is made of the assistance given by Mr. John R. Coombs, petroleum engineer, Magnolia Petroleum Company, in the preparation of this paper.

Geologists Elect

Thornton Davis, consulting geologist, Peerless Oil and Gas Company, San Antonio, will be president of South Texas Geological Society for the forthcoming year. Other officers are: Marion J. Moore, Transwestern Oil Company, vice president; Paul B. Hinyard, Shell Oil Company, secretary-treasurer and Leavitt Corning, consulting geologist, member executive committee.

Wesley G. Gish, Transwestern Oil Company and Adolph Dovre, consulting geologist, were nominated as district representatives to AAPG.

Geotechniques of Oil Exploration

■ CONTINUED FROM PAGE 22

regardless of the type of trap containing them. But these methods are not independent of deductive reasoning. The only truly direct method of exploration possible is that method which actually brings the oil to the surface, and it is the high cost of haphazard drilling that we are trying to avoid by these other types of surveys. Properly used, all the direct surveying methods now in use are effective.

The first prerequisite for accurate surveying by any of the direct methods is to be sure that the field data is properly gathered. The operator must first know the shape or pattern of all possible types of production anomalies and their width as individual anomalies. He must also be well informed as to irregularities and possible accidental "skips" in pattern. These factors must be considered in determining the plan of sample pattern and the interval between sample points, or between field contact points in case of electrical surveys. There is no point in cutting down the cost of a survey by increasing the sample intervals until critical data is lost and interpretation becomes ineffective. For example, the writer has known of small oil pools of 40 or 50 acres extent to be marked with marginal anomalies which are less than 600 or 700 feet across. In such cases sample points in grid arrangement with intervals of 300 or 400 feet are necessary if the pattern is to be "pinned down" without a shadow of a doubt as to the true pattern.

Another prime necessity in the use of any direct method is full knowledge of the variables that enter into the data to be obtained. These variables must be eliminated, if possible, or, if not, the pattern must be strong enough to stand out well above the variable irregularities. Almost all methods of surveying are made more or less difficult by variables because all such work is related to surface soil or other sediments and it is the nature of sedimentary deposits to vary in physical and chemical content from point to point, both vertically and laterally, and even between points only inches apart. For this reason analyses or tests made from the same site fail to duplicate each other. This failure of duplication of value must not be taken as condemning the technique. It is when the *pattern* fails of duplication that the operator must doubt his method.

In addition to variables in value due to soil irregularities, variables due to changes in climatic condition are prominent among the problems of the engineer operating direct methods of exploration. For example the use of light hydrocarbons, especially when samples are taken near the surface, quickly brings to light the fact that values run very light in hot, dry weather, while best results are obtained in the winter months, especially where the ground is lightly frozen. Barometric changes also materially alter the light hydrocarbon picture. Resistivity surveys are affected by changes in the quantity of ground water. The same is suspected of radioactive surveys.

After making a proper selection of sample plan and having overcome the problem of variables, the operator must assure himself that his analytical method is sound. He must develop sufficient accuracy and dependability to make sure that he is not introducing new factors of error into his problem. The human element must be eliminated as far as possible. It is not necessary, on the other hand, that his equipment be developed to a point of perfection beyond that extreme of uncorrectable variables already carried in the problem. Such perfection would be like reading elevations on surface formations to 0.01 feet where the geologist carrying the rod could not be sure of finding the top of the bed with greater accuracy than 1.0 or 2.0 feet. From a practical standpoint, also, the method of reading or analysis should be within a reasonable cost range.

Having done field and analytical work in the proper way to eliminate all possible changes of misinterpretation there yet remains the final problem of studying and interpreting the pattern obtained. This problem is by no means simple. It requires a thorough knowledge of sedimentation and structural geology, fortified by long experience in studying all kinds of oil and gas bodies, plus a skillful application of all geological, chemical and physical principles entering into the problem. The interpreter must also bear in mind that many times he has two possible interpretations from a single pattern. He must make a choice between the two or else protect his client by selecting the test point, if possible, where either interpretation may result in success. Or, lacking this possibility, he must fairly tell his client that it will take two tests to prove the area.

If the operator plans his field work effectively and thoroughly; if he eliminates all possible eradicable variables; if he does his laboratory or measurement work carefully; and if he brings out a pattern that stands out strongly above all possible remaining variables, and if this pattern "makes geological sense," and if the interpretation is supported by all available geological or physical evidence, then the operator will be able to make an effective interpretation and recommendation.

Texas Independents Plan Aggressive Organization

A strong, representative organization of independent producers and lease owners for Texas is the aim of 40 independents who met following the recent Texas Railroad Commission proration hearing.

The meeting, called by H. J. Porter of Houston, discussed the need for such an organization in, for example, seeking to abolish OPA control of petroleum prices and keeping down crude production.

Porter was named chairman of the organizing committee. Members will be accepted from all parts of the state.

George McGranahan, W. J. Goldston, E. T. Thompson, John Blaffer, Frank Michaux, W. H. Hendrickson and Glen McCarthy, all of Houston, joined the following to give their support in the organization: E. L. Wilson, Walter Lechner and M. S. Church of Dallas, Bryan Payne of Tyler, Guy Warren of Corpus Christi, Arch Rowan of Fort Worth, Walter Henshaw of San Antonio, V. T. Newhaus of Mission, Miller Ainsworth or Luling, Ed Kadane of Wichita Falls, C. V. Lyman of Midland, Jake Sandifer of Breckenridge, M. G. Chaney of Coleman, Ollie Holman of Amarillo and V. C. Perini of Abilene.

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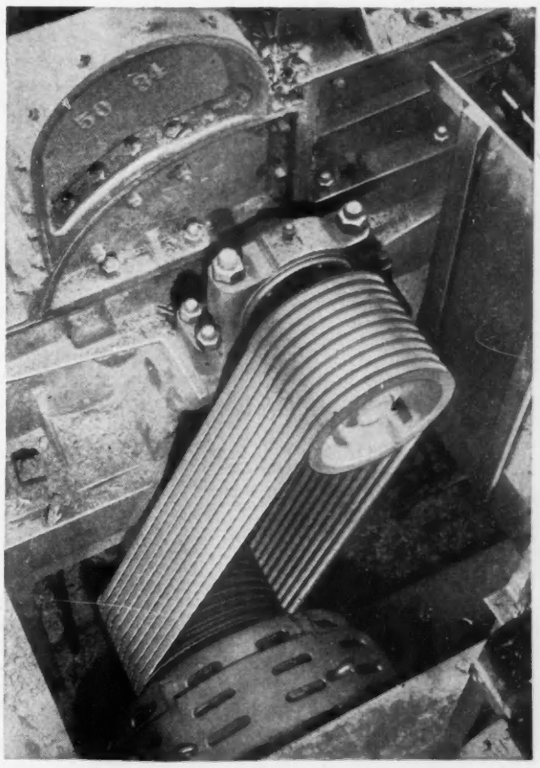

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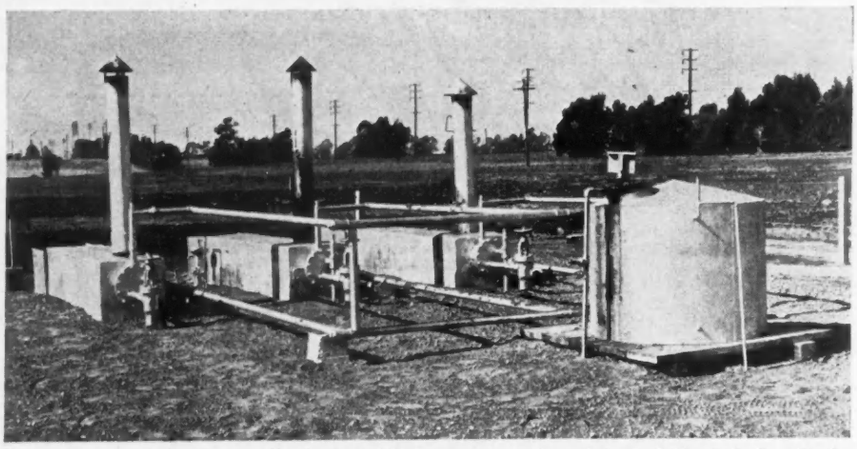


Gas from each of the three wells flows at full line pressure through its individual shell and tube heat exchanger. Here it is heated by constant circulation of hot water in a closed thermo-syphon system. The small make-up water tank is kept filled by a float-actuated valve. Note two-inch flow bean in front of each heater.

Well pressure maintained and accumulation of hydrates prevented by unique installation

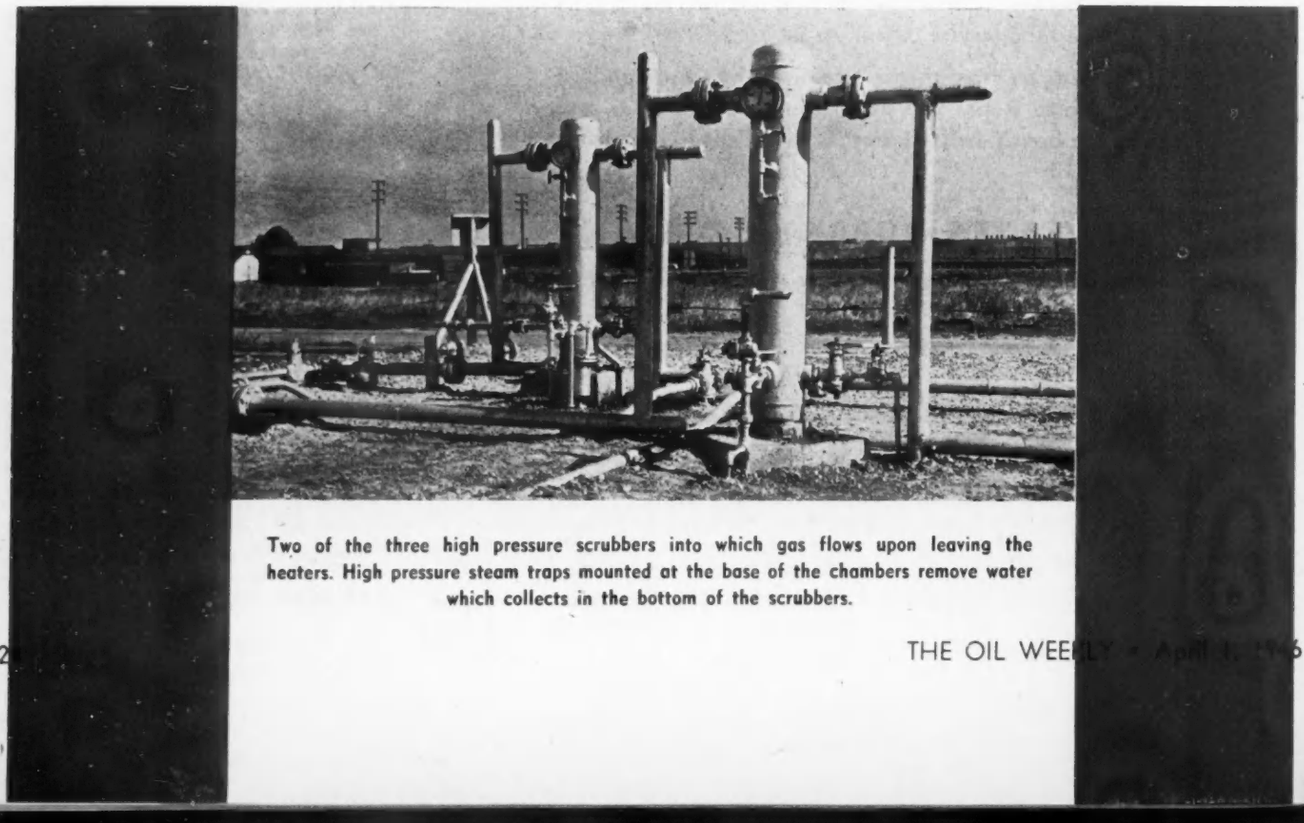
By GILBERT M. WILSON, Staff Writer

ACCUMULATION of hydrates, which in turn usually leads to the formation of ice in control orifices and chokes in the gas metering system has been successfully prevented in a somewhat unusual manner by the production department of Standard Oil Company of California. In the majority of cases, gas is produced and regulated first, after which it is heated and run through the metering devices. In this particular instance, however, the gas is taken from the several wells, passed at full well pressure through heat exchangers, and scrubbers, then to volume regulators, following which it is directed into the consumer lines.

Three gas wells recently drilled in one area to augment industrial fuel gas supply are connected individually into separate heating, scrubber, metering and regulating units. This method of handling permits the close regulation of wtihdrawal rates on individual wells without fear of interference from neighboring wells since bottom-hole conditions and producing characteristics between them vary considerably. Gas production for the individual wells are 1100, 2200, and 500 Mcf per day, with corresponding bean pressures of 1100, 800, and 1250 pounds per square inch. Water production is 0.6, 15.0 and 0.2 barrels per day per well respectively.

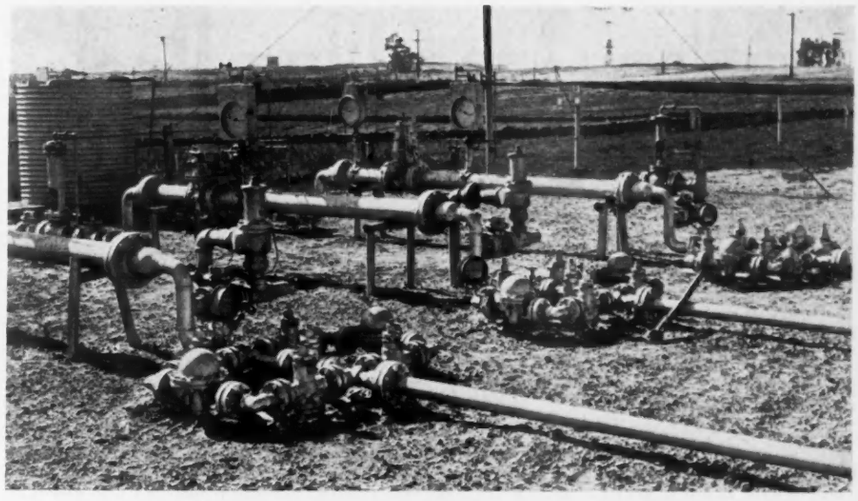
Flow Restricted at Heaters

Flow of gas from the wells is unrestricted although tubing beans are installed and pinched down slightly only as a safety measure. Two-inch flow lines are open between the well and its corresponding heat exchanger, but just be-

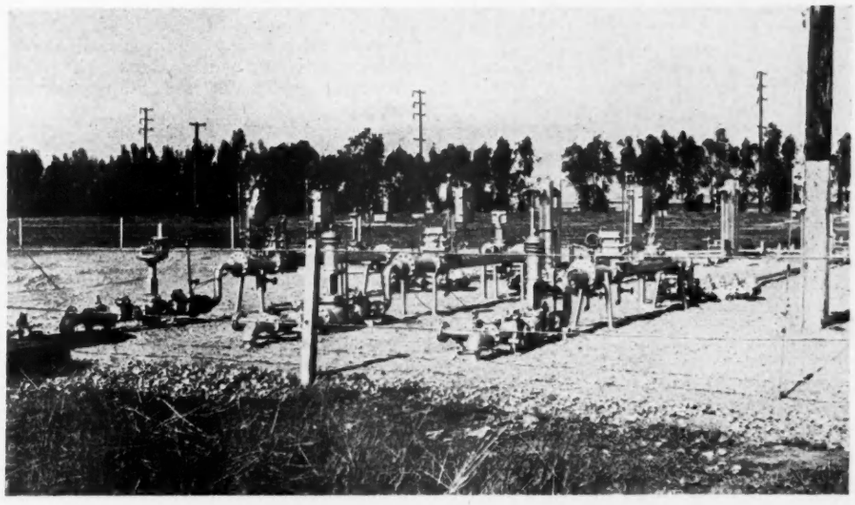


Two of the three high pressure scrubbers into which gas flows upon leaving the heaters. High pressure steam traps mounted at the base of the chambers remove water which collects in the bottom of the scrubbers.

Volume regulators which operate according to fluctuations in consumer demand are placed in line near orifice meter banks (right). The greater the demand the greater will be the flow of gas, except when volume reaches point at which flow bean cuts further withdrawal in protecting the well. Dual regulator set-ups permit servicing without interrupting regular service.



Neatly laid-out meter runs are elevated on pipe-leg supports for easy accessability in servicing (below). The gravelled, well-kept grounds are protected from stock by fences of sand-line strung on posts.



fore entering the heat exchanger shell, the gas passes through a 2-inch flow bean. This bean is pinched down partially to a predetermined point, which, under normal withdrawal rates, will allow the unrestricted flow of gas. However, should consumer demand for gas reach occasional peaks which might exceed the maximum efficient rate of production of the wells, the bean will restrict the flow when that point is reached.

Horizontally mounted in neat bricked-over form, the heat exchangers are gas-fired and of the shell and tube type. Each unit contains four passes of 2-inch seamless extra-heavy pipe. Shells are 10 inches in diameter and 10½ feet long. After passing through the 2-inch flow bean (shown mounted vertically in front of each heater) the gas enters the lower fitting and returns through the upper, both fittings being mounted in a removable flange head. Water maintained at approximately 140 to 150° F. is circulated constantly around the tubes in the exchanger, temperature remaining constant by circulating in a simple thermo-syphon circuit between heater units and a small supply tank. Fluid level in the make-up water supply tank is regulated by a float-controlled valve connected into the nearby fresh water main.

The small gas-fired heaters are set at ground level with the firebox end shielded from the wind by rectangular sections of light sheet steel. A single low-pressure regulator supplies dry fuel gas at proper pressures to all three burners. Dampers are installed in the short hooded stacks. While the small water supply tank provides water for all three heaters, each of the units is independent of its neighbor, parallel flow lines being provided which circulate the water according to the needs of each heat exchanger. The three parallel lines connect into the make-up tank through common inlet and outlet fittings. Neatly laid-out, the water circulating lines are well supported on small concrete piers and pipe spacers between the upper and lower lines.

High Pressure Scrubbers

After passing through the heat exchangers, the heated gas flows on to a bank of high pressure scrubbers, where, as in the case of the heaters, gas from each well is treated in individual units. The quantity of water contained in the gas is compartively small, but sufficient to cause trouble in freezing of chokes should it be left to pass through the metering devices. Each of the three cylindrical scrubbers is installed vertically and mounted on a concrete pier. They are connected to the pipe lines with heavy duty bolted flanges and each is equipped with a high pressure steam trap set at its base which removes the water as it accumulates in the base of the scrubber. Should the scrubbers be temporarily out of service for overhaul, by-pass lines are provided for free flow of the gas around the units.

Following removal of the water, gas then flows on to the volume regulators and meter runs. Twin installations of volume regulators for each meter run (shown at ground level ahead of meter run) regulate the quantity of gas that may pass with provisions for cutting in one regulator while the other is being repaired or inspected. The greater the demand for gas the more will be allowed to pass through this type of regulator but only up to a certain point. Should demand exceed the maximum efficient producing rate of the wells, the flow will be limited to only that which can pass through the partially-pinched bean installed at the heater unit and which was described previously. This method of regulating production is automatic, requiring no one in constant attendance and assuring maximum efficiency in delivering gas to the consumer without endangering productivity of the wells. The meter runs are elevated to convenient working height, being mounted on short horses made of scrap pipe materials.

Pressure Maintained

The entire installation has been unusually efficient, and is unique in that well pressure is maintained in all phases of the system, formation of hydrates is eliminated, and water-free gas is delivered in accordance with fluctuating demands. Individual installations are neatly arranged on a graded, fenced-in area, lines being buried where practicable and overhead lighting fixtures installed to permit servicing and inspection at night if necessary. Spacing of the several treating and control installations is such that additional units easily may be connected into existing ones should more gas wells be tied into the present system.

Drilling Firms Formed

Recently organized drilling firms in Oklahoma City include: The Double R Drilling Company, incorporated by Robert M. Jordan and T. L. Dennis of Oklahoma City and Ray J. Griffith of Shawnee, and Philco Drilling Company, organized by Phil A. Cornell, Glenna J. Cornell and A. D. Howell. E. A. Rumlty has purchased the interest of his partner, Sam P. Daniel, in the Daniel Drilling Company, and has changed the name of the firm to E. A. Rumley Drilling Company.

New Type Plug-Back Material Tried in Oil Wells

By JOHN C. PADGETT, Engineer,
Halliburton Oil Well Cementing Company

A NEW type of waterproof plastic cement is being applied on remedial work in producing oil wells and results have proved gratifying, although full significance of application may not be known until after a number of treatments have "aged" for a year or two. Known as oil well hydromite, the new compound is composed of a pulverized cementitious filler and a powdered resin. Both materials are activated by the addition of an accelerator and made into a slurry by mixing with water.

The setting time of the slurry of plastic cement can be controlled to very close limits. Field tests have proved that an initial setting time within the range of 60 minutes to 100 minutes is most practical to use in a well and most economical to the well owner in lieu of rig time and other variable costs.

After the initial set of the material has occurred, additional work may be performed before the material has reached its final hardness.

Within 10 or 15 minutes after the material has taken its initial set, it has a compressive strength of approximately 1500 pounds per square inch which is considered sufficient for many operations.

TABLE 1

Oil Well Hydromite Formulated for Use at Low Temperatures

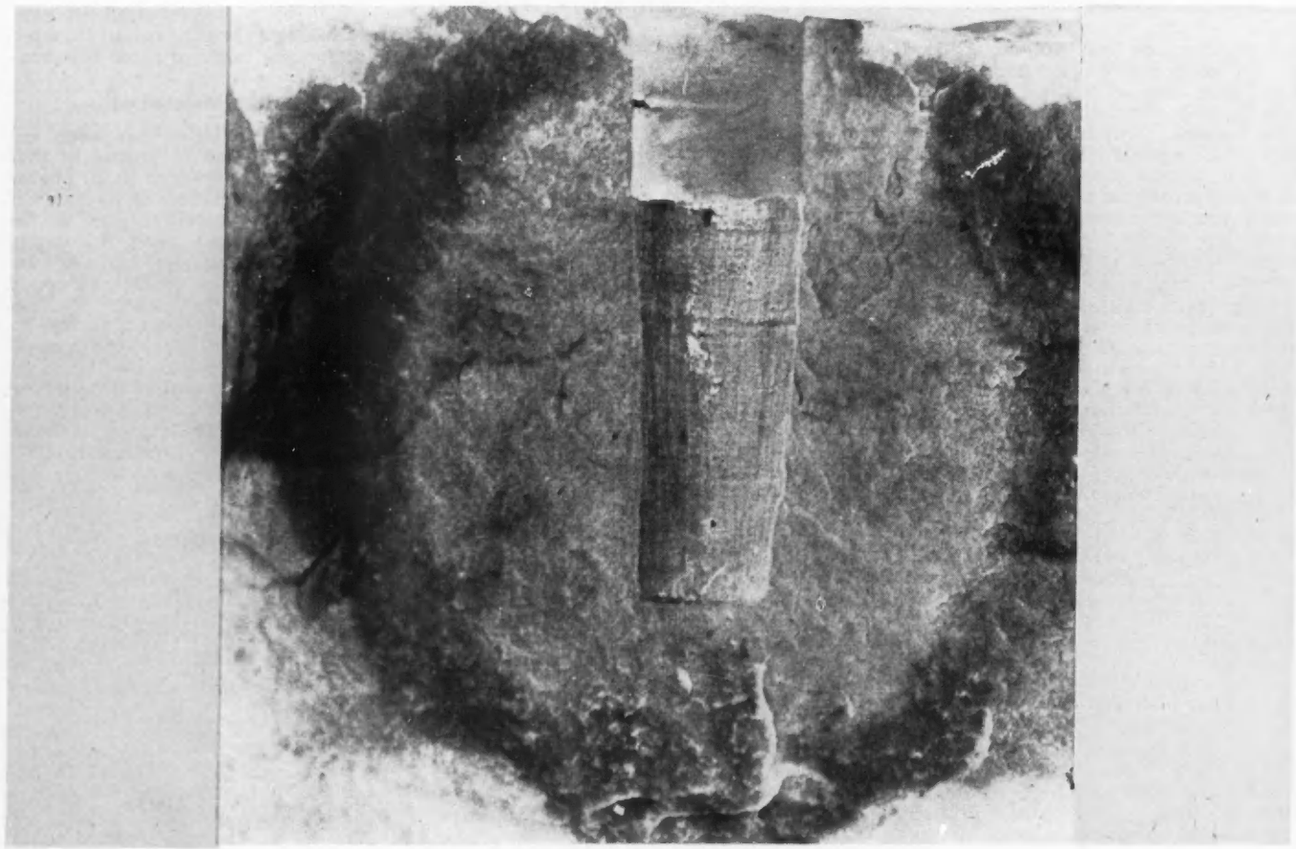
Temperature of Well °F.	Initial Set Minutes	Final Hardening Hours
60	100	20
65	90	16
70	75	7
75	75	5
80	75	6
85	75	6
90	75	5
95	75	4
100	75	4
110	70	3
120	70	3
130	80	10
140	80	10
150	75	8
160	75	6
170	75	5
180	75	4

Unique Feature

The new plastic cement possesses an added feature not usually found in ordinary plastics. It has a linear expansion of approximately 0.3 percent at the time it takes its initial set. This property has proved very valuable in remedial work where a good tight bond, to either the walls of the casing or the exposed surfaces of a formation, is necessary to insure adequate protection to the well being worked over.

In a manner similar to portland ce-

A Wilcox sandstone block with a one-inch cored hole squeezed with hydromite under 60 pounds per square inch pressure, then split open to show depth of penetration of liquid phase. Dark ring is a stain to show extent of penetration.



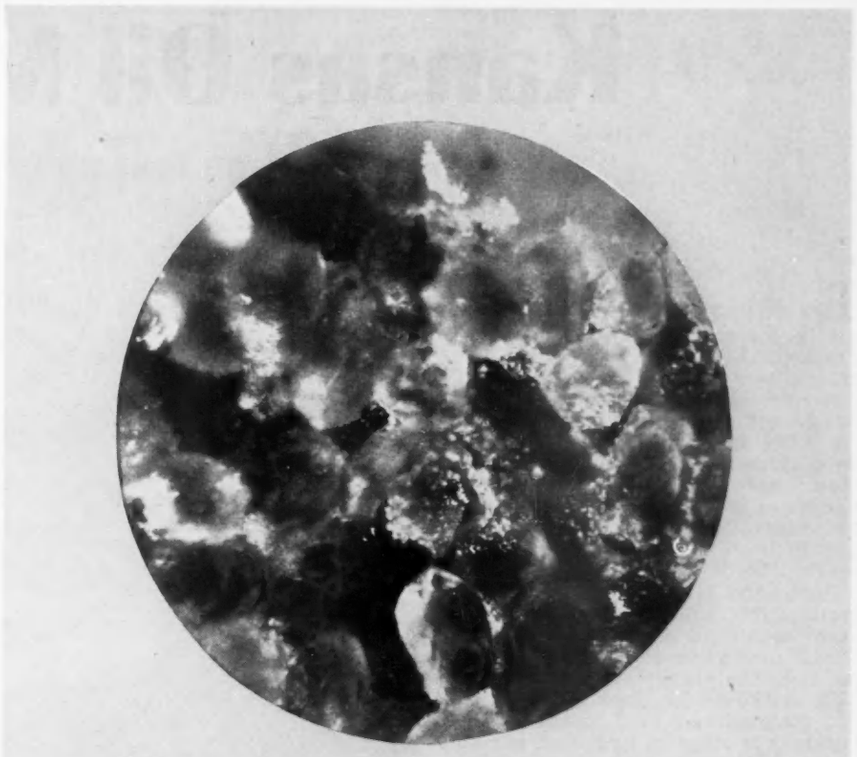
ment, the material continues to strengthen as it ages for a few hours. Table 1 gives the approximate time required for its initial set and final hardening at various temperatures ranging from 60 to 180° F.

The chemicals contained in the plastic are very stable; their action can be predicted with considerable accuracy, and they retain their quality for several months at room temperature without resorting to special storage precautions. It has a compressive strength of approximately 4000 pounds per square inch upon attaining its final hardening.

This material may be safely applied in any type of formation using only the ordinary methods and precautions. There are no chemicals in it which will attack a limestone or dolomitic formation and later cause a failure.

Laboratory tests have proved, and field tests have substantiated the fact, that the liquid phase of the new plastic cement actually penetrates the porous and permeable zones of the formation with which it comes in contact, and this liquid solidifies and seals off the permeability. The depth of penetration of the liquid phase is limited and controlled so that a maximum of about 12 percent of the slurry volume is available for penetration. This control comes about because the cementitious filler causes a filter cake to build up on the wall of the permeable formation, thus preventing loss of an excessive amount of the fluid phase. In the case of large fluid channels, crevices, or cracks, the loss probably will be somewhat greater, because some of the cementitious material will also penetrate these relatively large openings.

Penetration of a porous, permeable formation by the fluid phase of the material is brought about by applying 50 or 60 pounds per square inch differential pressure on the material when it is in contact with such a formation.



Photomicrograph of untreated Wilcox sand. Gray areas show the voids of porosity. Approximate magnification — 125 x D.

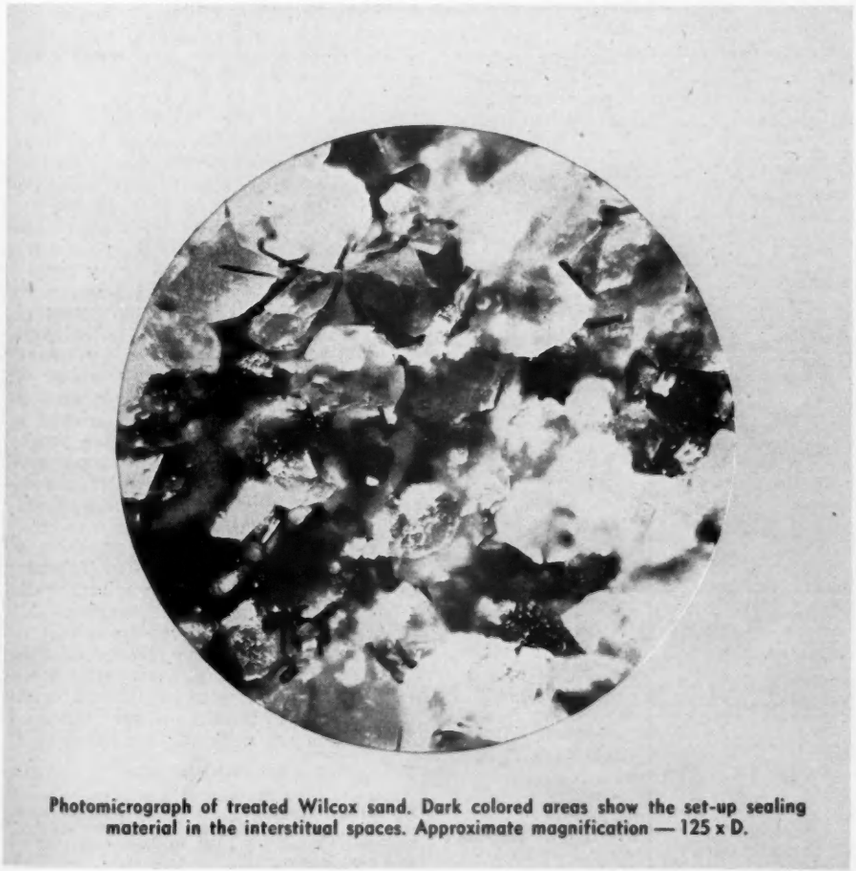
This property is demonstrated in an accompanying photograph. The dark lines in this picture show the extent of penetration of the liquid phase after the hydromite in the bore hole was subjected to differential pressure. Note also the tight bond of the plug to the surrounding formation, Wilcox sand in this case.

Cores extracted from solidified hydromite have been tested for permeability, and, within the limits of laboratory testing apparatus, no permeability has been found.

The material in its solid form is not reactive with substances ordinarily found in an oil well. However, much in the same manner as neat cement, there is a small amount of solubility if immersed in strong hydrochloric acid. This property is not sufficient to condemn either. Accordingly, where the new plastic cement is used in a low permeability limestone or dolomite well which is subsequently acidized, it is suggested that a blanket solution or weighted mud be placed in the well to prevent prolonged contact with acid. Even for extraordinary conditions, where the acid job might extend to four of five hours, no special precautions are felt necessary unless extremely high acidizing pressures are used.

The new plastic cement is applied by the dump bailer method which is used in conjunction with other similar services.

Up to this time, no attempts have been made to mix small quantities of this material with the high speed jet mixer and displace the slurry to a pre-determined depth through tubing. However, with large volumes of this material, it can be used satisfactorily in squeeze work.



Photomicrograph of treated Wilcox sand. Dark colored areas show the set-up sealing material in the interstitual spaces. Approximate magnification — 125 x D.

Kansas Oil Mine

By G. E. ABERNATHY and J. M. JEWETT
Kansas Sate Geological Survey

THE FIRST petroleum mining project in Kansas is being developed by Frank C. Thomas of Thomas & Thomas, mining operators, St. Louis, Missouri. The mine is on the abandoned Black Lease on the Hugh Whiteford farm in the SW¼ of 9-19s-24e, Miami County, about four miles north of LaCygne. Miami was one of the first counties in Kansas to produce oil and gas (Jewett and Abernathy, 1945, P. 179), and oil was discovered near Paolo in 1860 (Haworth, 1908, P. 122).

Production records of the pool are not available, although it is reported to have been drilled in 1927 and 1928, with a total production of about 600 barrels per acre. The drillers' logs of six of the wells drilled on the Black lease indicate that the producing sand has an average thickness of about 25 to 30 feet, and occurs at a depth of about 210 feet below the surface and about 162 feet below the base of the Hertha limestone. The evidence indicates that the producing sandstone is the "Wayside sand" in the Marmaton group. A generalized geologic section compiled from drillers' logs is shown in the sketch below.

Photo Courtesy Bureau of Mines, Bartlesville, Okla.

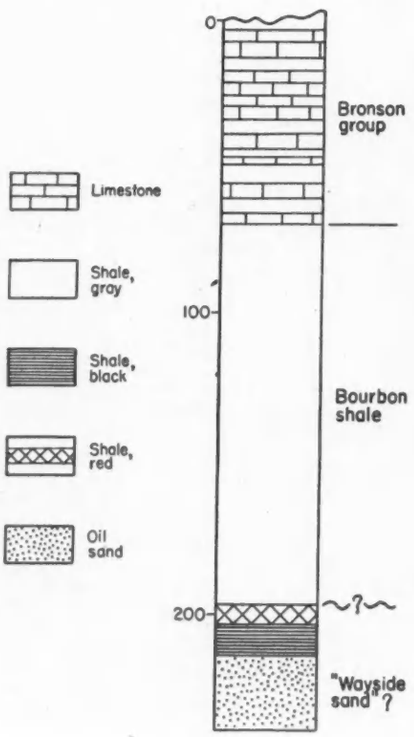
The "oil mine" near LaCygne, Kansas, showing the rock being lifted from the shaft with a drilling line on a standard cable tool drilling rig. The bucket of rock was then swung away from the shaft and dumped by manipulating the drilling line and sand line which passed through a pulley on the mast in the center of the rock pile.

Combination of Methods

The project is a combination of mining methods, consisting of the sinking of a shaft and the drilling of horizontal holes from the bottom of the shaft into the oil sand.

Thomas reports that the shaft was commenced on October 30, 1943, reached the oil sand at 200 feet on June 23, 1944, and was completed about 90 days later at a depth of 230 feet. The shaft is square, seven feet by seven feet. A portable drilling machine was used as a hoist in the sinking operations, the derrick serving as a mine headframe. Reinforced steel oil drums with bails attached were used for hoisting the rock from the shaft.

Before shaft sinking operations started, five holes eight inches in diameter were drilled with the drilling machine to 230 feet. One hole was located in each corner of the seven-foot square shaft pattern and one hole in the center of the pattern. These holes were filled with sand, then cleaned out and shot in short rounds with gelatinized nitroglycerine. The center hole, which was a vertical hole without any "cut," was fired first, then the holes in the corners were shot to square up the shaft. This method of shaft sinking, while successful, proved to be rather costly. The shaft was cribbed as it was sunk. Small amounts of water were encountered at several places in the shaft and these were later cemented by pouring cement back of the cribbing. This method seemed to be satisfactory at the time, but at present much difficulty is caused by water entering the shaft at various places. At the bottom of the shaft two stations 16 feet square were excavated and cribbed. These were used as work rooms from which the horizontal holes were drilled.



Radial Pattern

Fourteen horizontal holes which have a total footage of more than 7000 feet were drilled in a radial pattern from the shaft. They have diameters of 3¾ inches, 3 7/8 inches and 4¼ inches. The maximum length hole is 700 feet and the minimum length, 350 feet. They are all located in the oil sand and about eight or nine feet below the black limestone cap rock. The horizontal holes were drilled with a core-drilling machine. Each hole is equipped with about 40 feet of 3 or 3½ inch pipe cemented in the hole. Each pipe has a valve and is connected to a small tank which serves as a sump, from which the oil is pumped to the surface. Thomas reports the oil to be 29 to 31 gravity, and that it will flow 25 to 50 barrels per day.

The project is not in production at the present time according to Thomas, because of delays caused by labor, equipment, and various other difficulties. He reports that this project was a test or proving ground for the idea of oil production by means of horizontal holes, and that a similar project is being developed at Richards, Mo., where improved methods in shaft sinking are being used.

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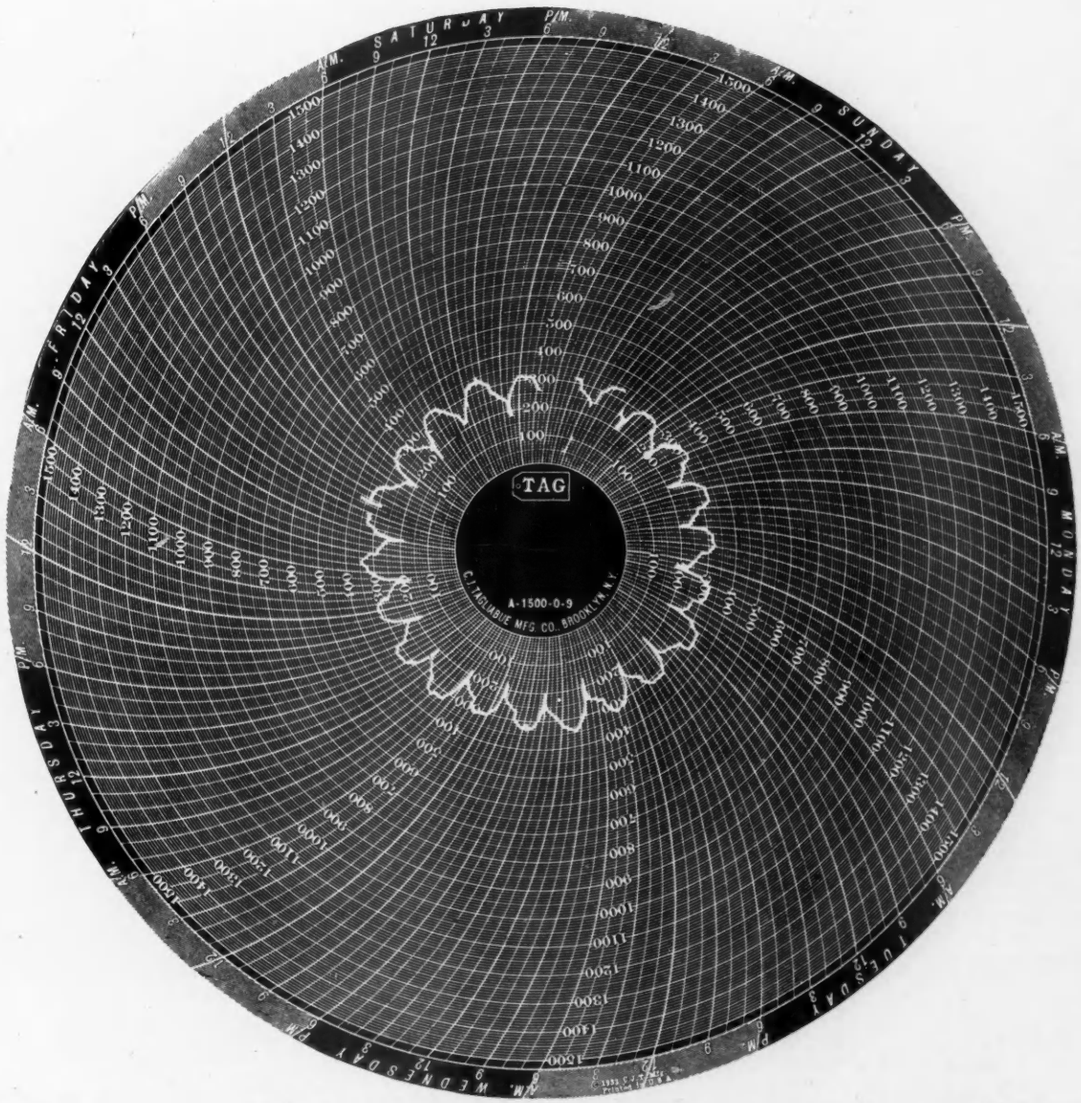
Automatic Expulsion of Water From Wells Aids Flow

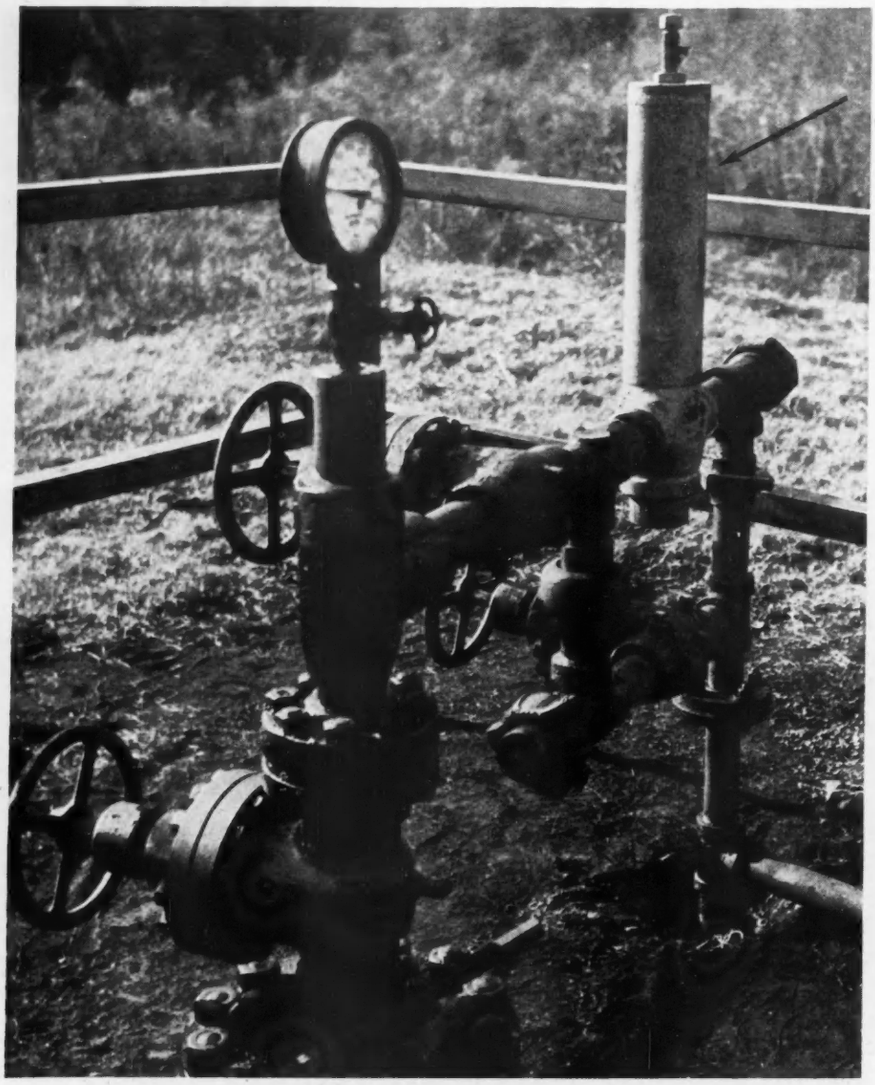
By GORDON B. NICHOLSON, Staff Writer

TO POSTPONE arrival of the inevitable artificial life stage with the corresponding increased lifting costs incurred, several operators in fields on the Gulf Coast install automatic purgers as part of the surface equipment to intermittently expel the head of water which builds up in the tubing of many wells. The mechanical devices, designed to open automatically for releasing accumulated water when it begins to affect the flow characteristics of a well, are growing increasingly popular, replacing manual manipulation of valves or frequent readjustments in choke size, which requires considerable attention.

Removal of water by periodic accelerated flow lessens the likelihood of allowing formation of a column of heavy fluids to kill weak wells, and permits an extension of the natural flow period through a choke with normal pressures on the tubing. Mechanical purgers are designed to open and close with the changing tubing pressures which indicate alterations in gas and water content of the oil produced. Automatic acceleration of flow from the well when water first begins to accumulate, as evidenced by declining tubing pressures,



Regular cycles recorded on a 24-hour chart show action of the purger which opens when the tubing pressure falls. After expulsion of water column the purger closes and flow resumes through the choke.



A purger is often mounted on a bypass around the production choke. With a drop in tubing pressure, the valve opens and flow occurs through the bypass in addition to the regular choke until water is expelled. Tension on the spring which motivates the valve is adjusted by turning a set-screw, adapting the purger to a wide range of pressures. Arrow points to purger.

flushes the water from the tubing before it advances to a detrimental stage, providing a continual periodic purging on a round-the-clock basis and assurance that a water head will not form and inadvertently kill a well during the absence of production personnel.

Withdrawal of oil and gas from a petroleum reservoir creates gradual changes in the natures of both the reservoir and the well, including among other things diminishing bottom hole pressures and often an encroachment of water. Modern production methods, due to a combination of legislation and sound operating principles, employ the best techniques and mechanical aids as a means of maintaining original reservoir conditions to lengthen the flowing lives of wells, increase ultimate recovery, and curtail overall lifting costs per barrel of oil recovered.

Surface Choke Use

A universal operating practice includes the use of a surface choke which applies a back pressure to the formation and the tubing, and retards the velocity of fluids moving through the tubing toward the surface. Often, after water appears in the production, the velocity of fluids is so slow that water separates from the oil and has opportunity to drop back into the tubing, with the oil and only minor portions of the water being produced. Accumulation of water which forms in this manner is reflected by a drop in tubing pressure apparent to the surface, and continuance of producing under the same conditions often aggravates the grievance with the result that increasing amounts of water accumulate in the bottom of the tubing, with pressure dropping accordingly. In many wells, the tubing pressure declines to a negligible factor, and often a well ceases to flow entirely.

In this way, a small choke designed to restrict production to the allowable or to the optimum rate for a particular well in accordance with conservation minimum gas-oil ratios, and sound production practices often results in a weak well loading with water and the flow stopping. If, when water first begins to form, the rate of flow is increased until the water column is emptied from the tubing, many wells will continue to flow longer, although with evacuation of fluids from the tubing, the gas-oil ratio usually increases. With first appearance of gas as indicated by rising tubing pressure, if flow is reduced to meet requirements, normal ratios are resumed and continue until water again appears.

To eliminate the obvious operational disadvantages of having personnel present to adjust valves on the Christmas trees as a means of expelling the accumulation of water, a well purger containing a spring-loaded valve is attached to the flow line and, motivated by variations in the tubing pressure, automatically controls movement of fluid from the well as prevention of forming a water column. The valve is placed in the off-tubing wing of the Christmas tree, or in a bypass around the choke.

After the tubing pressure drops to a predetermined value, the spring forces the valve to open, allowing a rapid evacuation of fluid from the tubing, during which period the well produces through both the bypass valve and the regular choke. With emptying of water from the tubing, the pressure rises to normal as volume of gas begins to increase, and the pressure serves as the force to close the valve against the spring pressure.

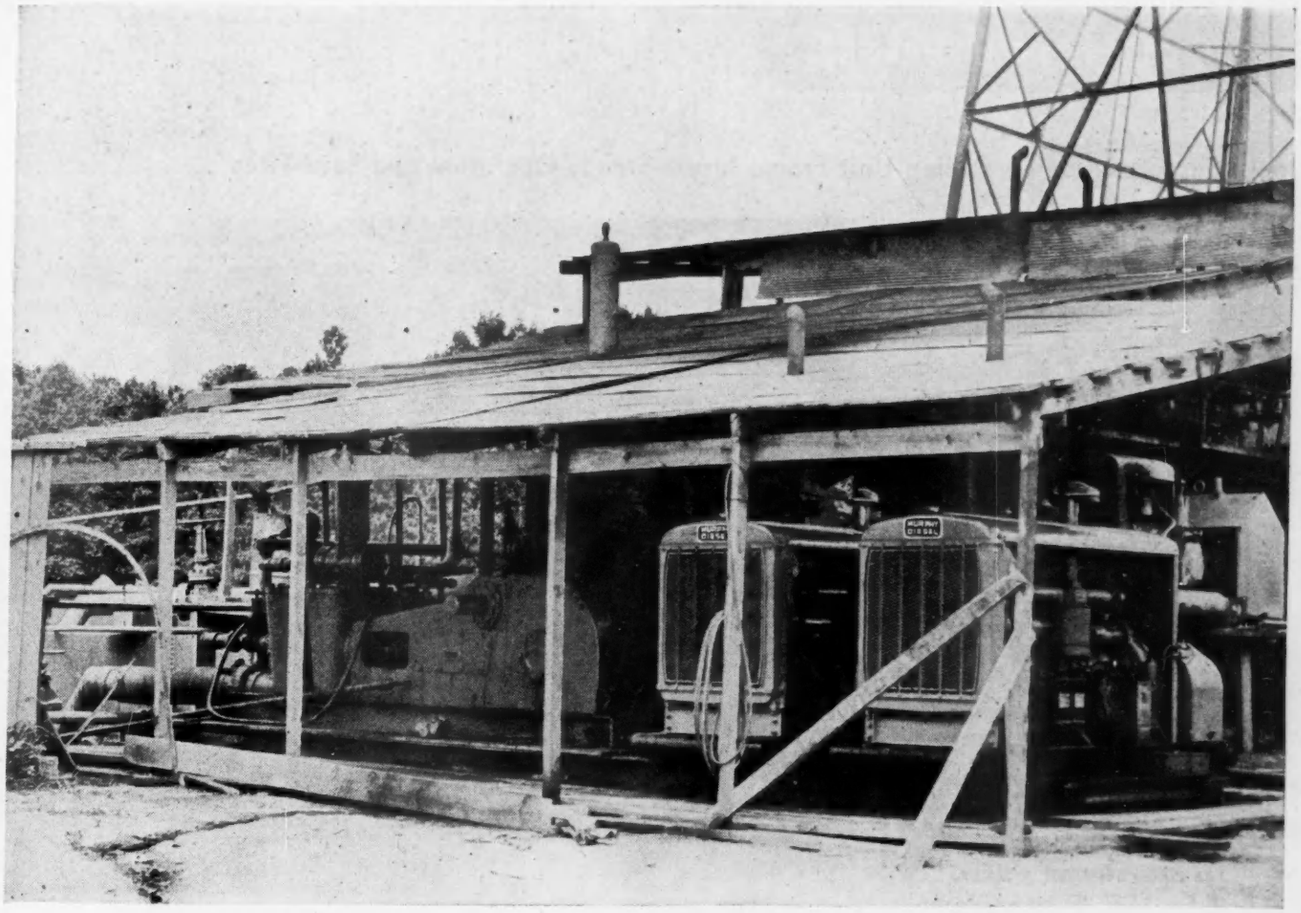
Recording gauges placed on the flow lines of several wells using mechanical water purgers show a continuous 24-hour functioning. In most cases, regular cycles are observed in which the tubing pressure gradually declines with the appearance of water, followed by a sharp drop as the mechanical purger opens, then a prompt rise in pressures as the tubing empties, and a leveling at normal production rates. Low pressure depressions occur at regular intervals, and each designates a potential critical point in the flowing life of a well.

Purgers Adaptable

The purgers are adaptable to a wide range of well pressures, with the size of the spring determining the operating pressures. A spring of a given size, however, is also adjustable to a considerable pressure range, as each purger is equipped with a set screw which is easily manipulated to change tubing pressures required for motivating the valve. Thus, when a purger-controlled well finally ceases to flow and resorts to some form of artificial lift, the device is easily removed to another well and adjusted for the new operating conditions.

Automatic purgers have been used successfully on pumping wells in some cases, and are particularly applicable to pumping wells which flow after a period of agitation during which the column of heavy oil and water is removed. After the well starts flowing in this manner, the pump is shut off, and with the purger opening to periodically expel water at an increased rate of flow through the tubing, flowing pressures are maintained.

Periodic expulsion of water will not prevent wells from ultimately reaching the point where installation of artificial lift equipment will be necessary to maintain production. But by prolonging the flowing lives of wells, whether for a few weeks or, in many cases, over a period of several months, the inevitable rise in per-barrel costs is averted for a corresponding length of time. Stated strictly on a dollar-and-cents basis, each barrel of oil brought to the surface by artificial means cuts deeply into the per-barrel value of the oil, and prolonging the flowing life of a well brings increased returns to the operator.



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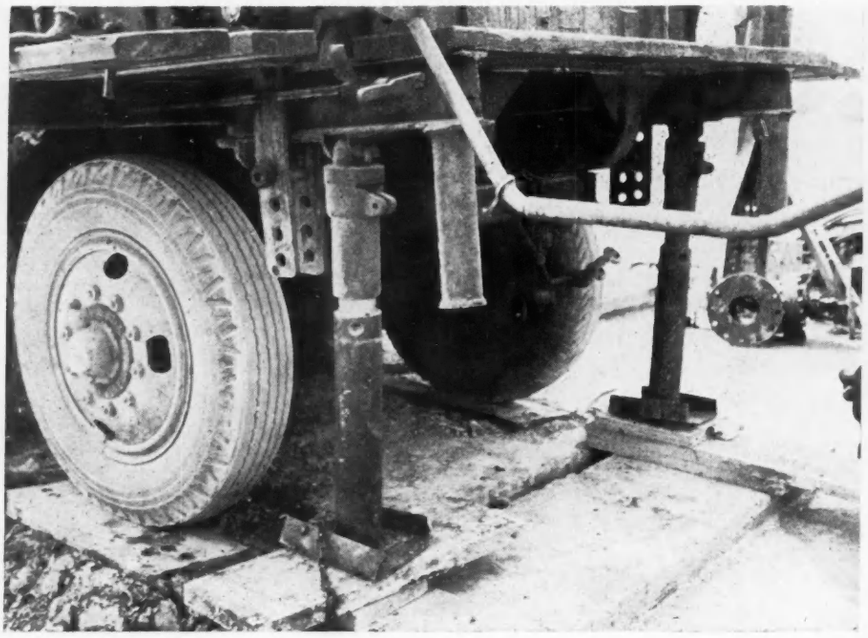
By modifying a pair of heavy screw jacks and suspending them in hinged fashion underneath the pulling unit frame, one operator saves much of the time formerly spent in blocking up the truck-mounted unit preparatory to pulling the well. Jacks are suspended on a special pair of lugs welded to the underside of the frame and are pinned so as to permit their being swung up and lashed in a lateral position close to the unit frame whenever the truck is travelling from one well to another. A short piece of channel iron forms a broad footing for each jack. Only one man can operate the pair of jacks, if necessary, while other crewmen are working on other details of rigging up.

PULLING UNITS

To protect the screw threads of the jacks while on the move, one operator finds it advisable to provide boots, fashioned from split inner tubes, which are wrapped and wired in place.



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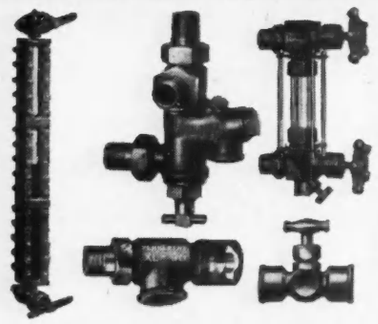

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See Pages 2450 to 2455, Composite Catalog

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Oil Drum and Copper Pipe Provide Stuffing Box Lubrication

An automatic feeder to insure polish-rod lubrication was erected by the operator of one well of small fluid content to prevent damage to stuffing box packers during the frequent periods in which the well pumps off.

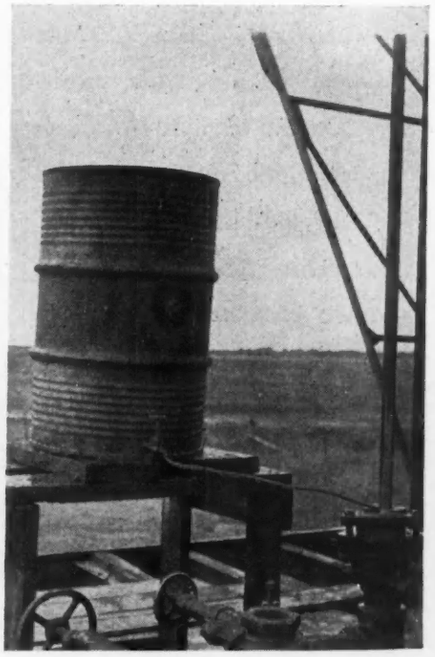
POLISH-ROD LUBRICATION

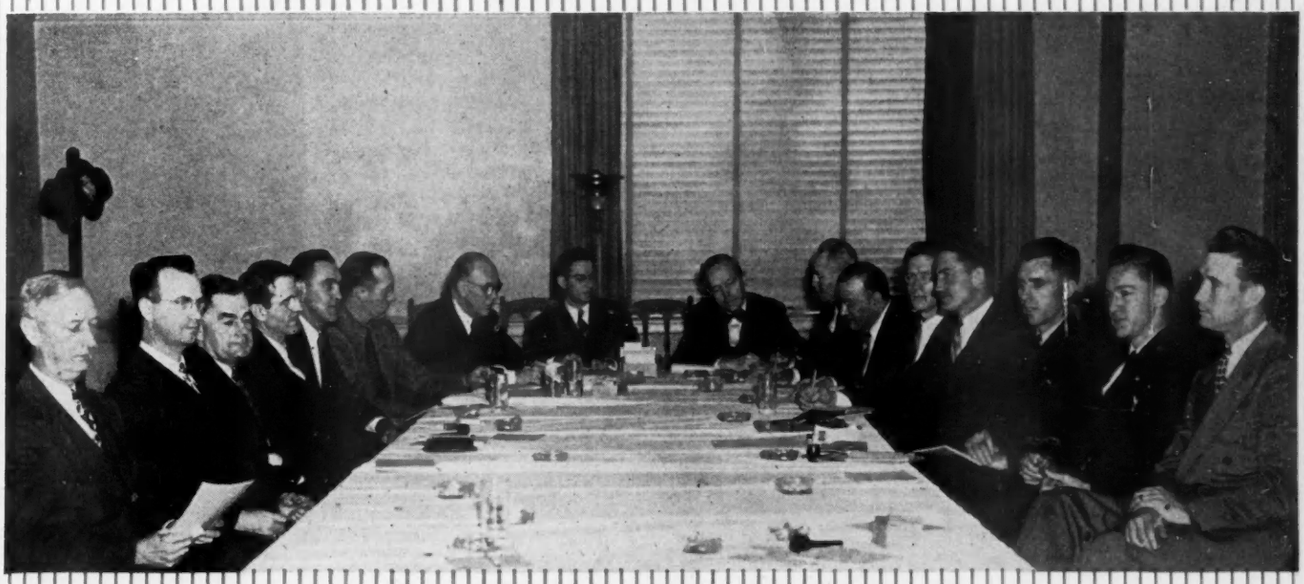
A standard 50-gallon oil drum provides storage container for the lubricant, being set atop a low wooden platform located close to the well head. A hole is cut through the drum wall near the bottom, and a short ½-inch nipple welded over the hole. A ½-inch gate valve is placed on the open end of the nipple, followed by a swage which reduces the size to ¼ inch. Copper tubing of appropriate length is added, extending to the top of the stuffing box and resting with its open end directed toward the polish rod.

The valve is adjusted to allow passage of a small flow of lubricant, feeding of the fluid being by gravity, resulting from elevation of the tank and weight of the hydrostatic head. A constant flow of lubricant is thus directed on the polish rod, assuring its lubrication regardless of well conditions, preventing overheating of the rod with subsequent damage to the stuffing box rubbers and the wastage of oil through the worn packers. Replacement of packers and frequent messy cleanup jobs are lessened.

Capacity of the container insures continuous lubrication for relatively long periods without refilling, and resupply is readily available simply by bleeding from the flow line.

The wooden platform which supports the oil-drum at the proper height to insure flow to the stuffing box is mounted on a sturdy timber base so that it will remain in position, but may readily be moved bodily to one side when the well must be serviced. The drum may be retained in position on the platform by a pair of curved guides, or simply by driving a few 20-penny nails into the base around the chime ring.





PICTURE *of* MEN AT WORK *for you*

For five days in March the field and office editorial staffs of The Oil Weekly gathered together for their 28th annual conference.

They blueprinted for you . . . put on the drafting board as it were . . . their plans for the rest of 1946 and for early 1947.

Subjects, assignments, contacts with who's who in the world of oil were set down.

Air tours of global oil fields were plotted.

A calendar of special feature issues was drawn up.

New methods . . . new kinks . . . new problems . . . new equipment . . . new fields . . . new wells . . . new records . . . new names . . . new reserves were bandied about. In fact *new* was the conference's keynote and the word was spoken so frequently it became monotonous . . . like old stuff.

Topics suggested by 301 subscribing readers (perhaps suggestions that you yourself sent in) were acted upon.

It was a lost week end for the families of these editors but it was a beneficial get-together for The Oil Weekly and *for you.*

Yes indeed, our title above is aptly worded . . . *picture of men at work for you.*

1946 *special* DATES

World Oil Atlas	May
Pipe Line Engineering	June 24
Mid-Year Statistical Number	July 29
Gulf Coast Issue	Sept. 16
American Petroleum Institute Number	Nov. 11

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See Composite Catalog Page 1907

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TECTONIC MAP
of the
UNITED STATES
1944

Prepared under the Direction of the Committee on Tectonics, Division of Geology and Geography, National Research Council.
Chester R. Longwell, Chairman, Philip B. King, Vice-Chairman,
Charles H. Behre, Walter H. Bucher, Eugene Callaghan, D. F. Hewett, G. Marshall Kay, Eleanora B. Knopf, A. I. Levorsen, T. S. Lovering, George R. Mansfield, Watson H. Monroe, J. T. Pardee, Ralph D. Reed, George W. Stose, W. T. Thom, Jr., A. C. Waters, Eldred D. Wilson, A. O. Woodford.

A NEW GEOLOGIC MAP OF THE UNITED STATES AND ADJACENT PARTS OF CANADA AND MEXICO

Geologic structure, as evidenced and interpreted by a combination of outcropping areas, bedrock, surface disturbance, and subsurface deformation, is indicated by colors, symbols, contours, and descriptive explanation. Igneous, metamorphic, and selected areas of sedimentary rock are mapped. Salt domes, crypto-Volcanic disturbances, and submarine contours are shown. The base map shows state boundaries, rivers, a pattern of cities, and 1-degree lines of latitude and longitude.
The scale is 1:2,500,000, or 1 inch equals 40 miles. Printed in 7 colors on 2 sheets, each about 40 x 50 inches. Full map size is about 80 x 50 inches.

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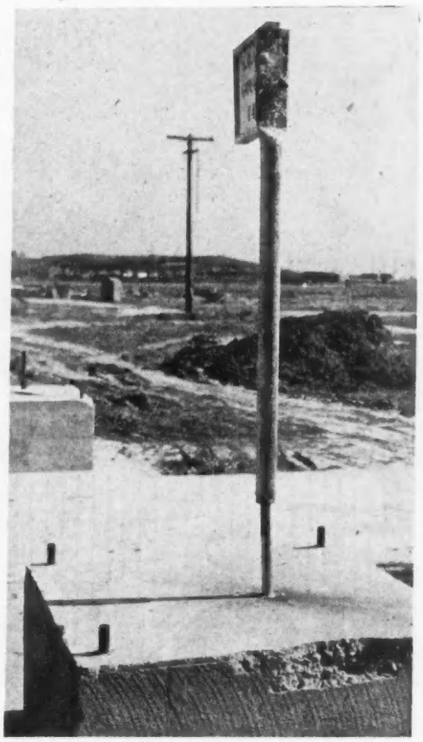
Removable Well Sign Post Utilizes Foundation Pier

LEASE MARKERS

A simple and inexpensive means of identifying wells which have no derrick structure or mast on which a sign ordinarily would be hung, is illustrated in the accompanying photograph. A hexagonal nut which will screw on to the threaded end of the derrick leg anchoring stud which remains in the concrete pillars, is welded to the bottom end of a short length of 2-inch pipe. Flattened at the upper end to permit attaching bolts for holding the sign itself out at right angles from the post, the support is easily placed and is a permanent installation until the well might be worked on, at which time it is merely unscrewed and laid aside.

Held upright in this manner, it is easily seen by field crews and supply company personnel who may otherwise spend considerable time searching for some means of identifying the well number.

To prevent the turning of the sign by unauthorized persons, it is well to thread a lock nut onto the projecting stud before running the sign support down to place. If the lock nut be pulled tight with a pair of 36-inch wrenches, the sign is effectively anchored against meddling or accidental facing in the wrong direction.



Safeguard on Unhooking Device Protects Switcher

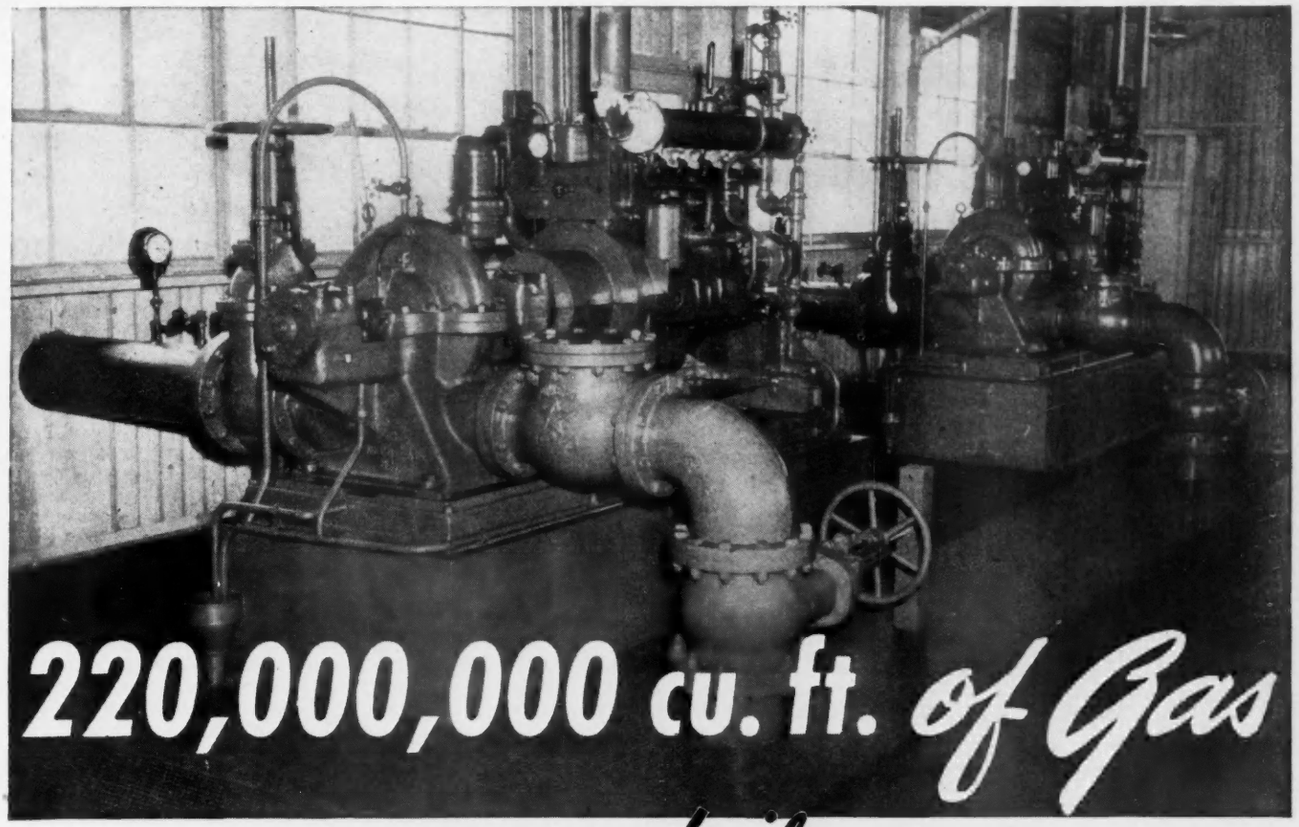
ROD-LINE OPERATION

Unhooking a well from the central power pull line is no problem and presents no risk for the pumpers of one company. No special pick-up tools need be carried since the take-off device is complete in every respect. Set in concrete at the edge of the derrick floor is a take-off post made of a short length of casing, in the top of which is inserted a wooden doll head which supports the pull rod on the well side of the take-off post. Swung from near the top of the post is a 3-foot bail or U-shaped rod made from sucker rod material which is used to engage a hook on the plant end of the line.

As shown, a short stud projecting from the side of this bail enables the pumper to grasp and hold the device without fear of getting his hand caught. This bail engages a smaller hook welded to the bottom side of the heavier hook, the latter being babbitted to the plant end of the line. Since the line at this point is approximately head-high, further precaution was taken in that a 2-step platform was installed beside the post so the pumper will experience no difficulty in seeing what he is doing.

The platform also serves as guard to prevent walking into the high-level rod line, with probable injury from a blow by the reciprocating hook unit.

The simplicity and time-saving features of this device have more than paid for the slight additional cost of installation.



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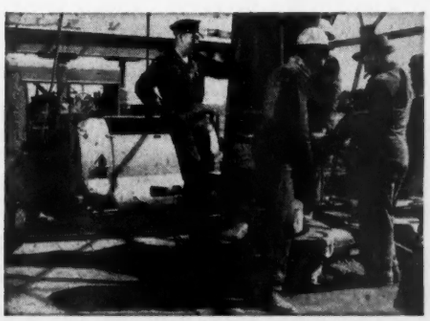

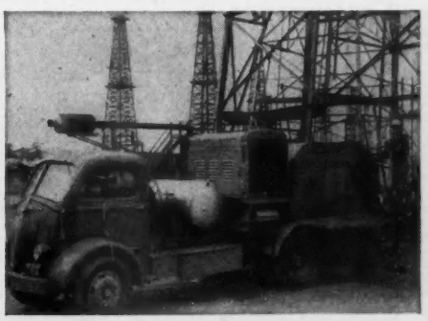

WAUKESHA
OIL FIELD POWER

Gasoline Stocks Continue Decrease, Light and Heavy Fuel Oil Accumulates

Stocks of gasoline continued to decrease and light and heavy fuel oil stocks began to accumulate during the week ended March 23.

Production of crude oil and runs to refinery stills were up moderately, while the output of gasoline and distillate fuel showed a drop for the week. An increase in the production of residual fuel oil and a lessening of market requirements resulted in a considerable addition being made to this fuel's stocks. These trends were indicated by the latest weekly report of The American Petroleum Institute.

Crude production in the United States averaged 4,431,000 barrels daily during the week ended March 23, an increase of 16,000 barrels per day over the previous week, and 351,000 barrels, or 7.3 percent, less than the comparable week a year ago.

Crude runs to U. S. refinery stills amounted to 4,683,000 barrels per day, exceeding the previous week's daily average by 76,000 barrels, and representing a drop of 37,000 barrels, or less than 1 percent, from the same week of last year.

Stocks of refinable crude oil totaled 226,233,000 barrels on March 16, as reported by the U. S. Bureau of Mines. This was an increase of 121,000 barrels during the week, and 6,747,000 barrels, or 3.1 percent, more than was held March 17, 1945.

Production of gasoline, including natural gasoline blends, amounted to 13,732,000 barrels, which was 118,000 barrels less than the previous week's output, and 1,385,000, or 9.2 percent, under the corresponding week of 1945. Gasoline stocks were reduced 219,000 barrels during the week, bringing current stocks to 104,562,000 barrels, which is 6.5 percent more than the 98,193,000 barrels on hand a year ago.

Distillate fuel oil production was 5,514,000 barrels for the week, a cutback of 141,000 barrels from last week, but 947,000, or over 20 percent, higher than the output of the same period of last year. Stocks of this light fuel oil continued to rise and ended the week at 26,667,000 barrels, 343,000 barrels more than was on hand a year ago.

The week's output of residual fuel oil was 214,000 barrels over the last week's 8,382,000, but was 221,000 barrels, or 2.5 percent, less than last year's figure. Current stocks of residual fuel are 37,906,000 barrels, an increase of 139,000 barrels during the week, but 5,014,000 barrels short of equalling the 42,920,000 barrels held March 24, 1945.

Trends of Operations and Changes in Stocks

Figures on crude stocks are from Bureau of Mines weekly reports; all others from American Petroleum Institute weekly reports, which are estimates on Bureau of Mines basis.

(All figures in thousands of barrels—add 000)

HIGHS AND LOWS OF RECENT YEARS

ITEM	Crude Oil Prod.		Runs to Stills		Crude Stocks		Gasoline Stocks		Gasoil and Distillate Stocks		Residual Fuel Oil Stocks	
	Barrels Daily	Week Ended	Barrels Daily	Week Ended	Barrels	Week Ended	Barrels	Week Ended	Barrels	Week Ended	Barrels	Week Ended
Highs:												
1941	4,337	11–22	4,120	10–18	266,187	3–29	99,727	3–29	[1]54,983	11–15	102,448	1– 4
1942	4,337	2– 7	3,961	1– 3	263,208	3–28	[1]109,281	3–14	47,861	11–14	95,857	1– 8
1943	4,436	11–13	4,331	12– 4	245,752	5–29	94,159	3–20	47,187	11–27	72,881	1– 2
1944	4,762	9–30	4,798	12–30	240,992	1– 1	89,162	4– 1	48,162	10–28	64,744	10– 7
1945	[1]4,944	7–14	[1]5,140	8–18	227,554	10–13	99,012	3–24	45,341	11–17	56,074	1– 6
1946	4,726	3– 2	4,779	3– 2	229,430	3– 2	105,233	2–16	35,199	1– 5	42,371	1– 5
Lows:												
1939	[3]1,601	8–26	3,125	2–18	[2]229,127	10–12	71,152	10– 7	20,722	4–15	105,397	4– 3
1941	3,364	1–11	3,490	1–18	240,399	11–15	79,923	10– 4	28,382	4–12	90,914	7–13
1942	3,297	7– 4	3,393	5–23	231,896	12–12	75,934	12– 5	29,240	4–25	72,962	12–26
1943	3,821	1– 9	3,579	3–18	232,191	1– 9	68,182	10–16	30,732	4– 3	57,596	12–25
1944	4,357	1– 1	4,228	2–12	220,258	9– 9	76,302	1– 1	30,232	4–19	49,737	3–18
1945	3,621	10– 6	3,409	10– 6	[4]211,813	8–25	70,791	10–13	26,483	3–17	38,548	5–26
1946	4,403	3– 9	4,498	1–12	218,193	1– 5	98,494	1– 5	25,131	3– 9	37,767	3–16

TRENDS OF 1945 AND 1946

Trends in Week Ended	Crude Oil			Gasoline		Gasoil and Distillate		Residual Fuel	
	Production Daily	Runs to Stills Daily	Stocks Week End	Production Weekly	Stocks Week End	Production Weekly	Stocks Week End	Production Weekly	Stocks Week End
1945:									
January 27	4,727	4,756	221,310	14,957	88,223	4,843	33,561	9,252	51,119
February 24	4,777	4,803	219,351	15,500	95,972	4,958	28,753	9,084	46,713
March 31	4,781	4,677	223,782	14,644	98,758	4,548	26,889	9,184	41,745
April 28	4,805	4,780	223,474	14,633	94,068	4,636	28,273	9,379	39,813
May 26	4,887	4,950	222,831	15,194	89,121	4,667	29,184	9,670	38,548
June 30	4,903	4,999	220,781	15,546	86,472	4,910	32,213	9,077	40,488
July 28	4,930	4,996	218,507	16,106	86,008	4,598	36,071	9,586	42,283
August 25	4,892	4,931	[4]211,813	15,986	84,693	4,960	39,782	9,356	46,201
September 29	4,357	3,812	222,387	11,913	79,552	3,940	43,689	7,047	46,853
October 27	4,273	4,838	224,230	15,530	74,335	5,159	43,472	8,691	45,943
November 24	4,469	4,648	219,363	15,681	83,184	4,802	45,258	8,800	47,474
December 29	4,474	4,729	218,918	14,546	95,205	5,055	36,651	8,765	42,447
1946:									
January 5	4,548	4,651	218,193	14,488	98,494	5,293	35,199	8,867	42,371
January 26	4,626	4,553	220,544	13,622	101,737	5,720	29,498	8,411	39,722
February 23	4,714	4,595	226,699	13,175	104,709	5,728	25,398	7,913	39,290
March 2	4,726	4,779	229,430	13,871	104,462	5,888	25,148	8,634	38,441
March 9	4,403	4,656	226,112	13,669	104,901	6,929	25,131	8,779	38,388
March 16	4,415	4,607	226,233	13,850	104,781	5,655	25,747	8,382	37,767
March 23, 1946	4,431	4,683	.....	13,732	104,562	5,514	26,667	8,596	37,906
March 24, 1945	4,782	4,720	[5]219,486	15,117	98,193	4,567	26,324	8,817	42,920
Change:									
In week	+16	+76	+121	—118	—219	—141	+920	+214	+139
In year	—351	—37	+6,747	—1,385	+6,369	+947	+343	—221	—5,014
In year	—7.3%	—0.8%	+3.1%	—9.2%	+6.5%	+20.7%	+1.3%	—2.5%	—11.7%

[1] All time peak. [2] Lowest between January, 1922 and July 1, 1944. [3] Lowest since October, 1922, due to shutdown of six Mid-Continent states. [4] Lowest since December, 1921. [5] Stocks, March 17, 1945.

Tide Water Associated Makes Employe Service Awards

Service emblems were given last week to 31 employes of the New York area of Tide Water Associated Oil Company who have been with the company for 25 years or longer.

Since 1925 a total of 6892 such decorations have been presented to employes who have served from 10 to 55 years with the organization. Fourteen employes have received awards for 50 years service, 108 for 40 years, and 1079 for 25 years.

Refineries Offered

Two more 100-octane gasoline refineries were put on the market for sale or lease last week by the War Assets Corporation as follows. A plant operated by Pan American Refining Corporation in Texas City, Texas, rated capacity 2400 barrels of iso-pentane daily, and the hydrogenation unit with a capacity of 8000 barrels of feed charge daily operated by Humble Oil & Refining Company in Baytown.

Barnsdall Buys Acreage

Forty acres in 12-20-13, Benton field, Bossier Parish, Louisiana, have been purchased by Barnsdall Oil Company, discoverer of this field, from M. L. H. Padgett, wife of Sheriff L. H. Padgett of Bossier Parish, for $3000 with mineral reservation. Barnsdall may build a $3 million recycling plant on the tract, which is six miles northeast of Benton, and about a mile west of the discovery well in Sect. 7.

What AXELSON Has Done for You in Forty Years

THERE IS NO ECONOMICAL SUBSTITUTE FOR AXELSON QUALITY

Universal progress in the manufacture of oil well pumps has been due largely to Axelson leadership.

Axelson has dedicated more than forty years to the discovery of better materials and methods for manufacturing a complete line of balls and seats alone, so that the heart action of any oil well pump equipped with the right Axelson balls and seats is materially improved and extended.

The research and development that have gone into Axelson balls and seats to cope with any condition found in any oil well are typical of the Axelson attitude in general. Their pumps, sucker rods, stuffing boxes, polished rods and related parts and items are in every detail important to men intent on getting maximum yield at the lowest cost per dollar invested.

Axelson pumping equipment may well add to the satisfaction of any producer in his Jones & Laughlin Supply Store.

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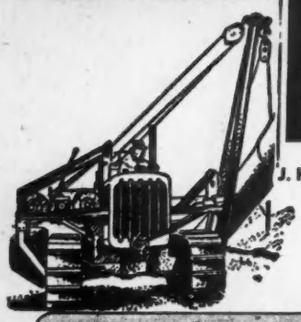
J. H. (Herb) Smith
Partner



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TRADING POST SECTION

ON PAGE 57 OF THIS ISSUE

Shortages Delay California Pipe Line; Construction Innovations Planned

Pipe shortages resulting from the recent strike in the steel industry have forced temporary suspension of major pipe laying activities of Standard Oil Company of California's 18-inch crude oil line between Kettleman Hills and the firm's Richmond refinery in the San Francisco Bay region. As a result of this delaying action, estimated date for completion of the line is being advanced to well within the middle of the year instead of in May as originally planned. Pipe deliveries may permit resumption of work on the line next month.

The $4 million line will mark the use of several innovations new to California pipe line construction. With the exception of nine miles which will be 20-inch, the line will be 18-inch, electric-weld pipe with extra-high yield points produced by stretching the metal with internal hydrostatic pressure. This new pipe will have a minimum yield of 52,000 pounds per square inch as compared with that of normal pipe which has 45,000 pounds. Ultimate strength of the new pipe is 72,000 pounds per square inch.

Gamma Ray Pictures Check Welds

Forty miles of the line will be joined by the new semi-automatic pressure welding process which has met with success in construction of certain Mid-Continent pipe lines. The special process, which results in a forced fusion of the pipe ends without the use of welding rods, employs a special machine which grips the pipe sections and forces them together under great pressure when the heated metal becomes malleable. This pressure welding of a portion of the line constitutes a field test by Standard.

Also employed for the first time by the company will be the practice of "spot-checking" of a number of welds daily by gamma ray pictures. In this process, the photo negatives, packaged in light-tight strips, are wound around the weld. A small piece of radium is then lowered through an opening cut in the pipe beside the weld and positioned in the approximate center of the pipe and opposite the weld. Emanations from the radium penetrate the pipe and welded area, and record on the negative any defects in the weld.

Paralleling the old Stanpac line which was converted from gas to crude oil transmission in 1942 to supplement tanker transportation during the war, the new line will run along the western rim of the San Joaquin Valley to avoid any large areas of corrosive ground. However, corrosion protection will be provided on 100 miles of the more corrosive areas by the use of Somastic pipe coating, while asphalt and fabric will cover the pipe in non-corrosive soils. Upon completion of the new line, the Stanpac line will be reconverted to transportation of natural gas from San Joaquin Valley fields to the Bay area. During the war, the maximum of 185,000 barrels daily which this line frequently carried is credited with having helped to establish record-breaking throughputs of the Richmond refinery.

Telemeter circuits will be provided on the company's existing telephone system as an aid to dispatching of crude oil volume. This system will transmit flow meter readings from both ends of the line and from Los Banos to the gauger's office at the Los Medanos Terminal.

940 p.s.i Initial Pressure

A booster station will be located at Los Banos and will increase pumping capacity of the line from an originally estimated 85,000 to 110,000 barrels daily. Existing steam-driven centrifugal pumps at Kettleman Hills pumping station will maintain an initial pressure of 940 pounds per square inch, while the equipment to be added in the Los Banos booster station will be capable of adding 650 pounds pressure at that point. The resulting 750 pounds discharge pressure will be sufficient to carry a capacity load 80 miles to the Los Medanos tanks. The new line is a cold oil system and will handle only the Kettleman and other light San Joaquin Valley types of crude oils.

Contract for constructing the line was awarded to Bechtel Brothers-McKone Company. Laying the line will consume slightly over ¼ the estimated $4 million total cost of the project, with pipe, right-of-way, and pumping equipment taking up the remainder of the cost.

Two Texas Pipe Lines Are Completed for Sun Company

Sun Pipe Line Company's 84-mile, ten-inch crude oil trunk line from the Seeligson area near Premont to Aransas Pass, Texas, and 34-mile, eight-inch oil line from the Kelsey-Bass field in Brooks County to the Sullivan-Mariposa field in Jim Wells County, Texas, are in operation.

These lines link several Southwest Texas fields to a tanker terminal at Harbor City, near Corpus Christi. J. R. Horrigan Construction Company, Houston, was the contractor.

Humble Buys Continental System in Texas Panhandle

Humble Pipe Line Company has purchased Continental Pipe Line Company's extensive crude oil gathering system in Carson and Hutchinson counties, Texas Panhandle. The deal also involves two 80,000-barrel steel tanks. The system consists of six-inch discharge lines and two- to four-inch laterals serving 250 well connections. Humble Oil & Refining Company has been purchasing the gatherings of this system many years.

Contracts Awarded for Ohio And West Virginia Gas Lines

Contract awards have been made by Hope Natural Gas Company and East Ohio Gas Company for the construction of approximately 285 miles of natural gas lines in Ohio and West Virginia. This construction plus installation of additional equipment calls for an expenditure of about $9,857,500.

Hope awarded contract to J. R. Horrigan Construction Company of Houston to lay 24 miles of 20-inch, and 36 miles of 12¾-inch lines in West Virginia. Pipe Line Construction Company, a Pannsylvania concern, was awarded contract on 55 miles of 12¾-inch line and Williams Brothers were given contract for 28 miles of 12¾-inch, also in West Virginia. These lines will be laid from Hope's Jackson compressor station to the Baileyville magisterial district in Wyoming County, W. Va.

Contract for the construction to 95 miles of 18-inch pipe from Hope's proposed terminal at Pipe Creek on the Ohio River to Austintown Junction, Ohio, and a 49-mile, 20-inch line to Cleveland, were awarded by East Ohio to Williams Brothers.

Construction on these projects is expected to get under way the latter part of May.

INGAA to Intervene in Rehearing Set by FPC

Independent Natural Gas Association of America has been granted permission to intervene in FPC's rehearing of the Northern Natural Gas Company case (Docket No. G-533). In the original hearing, FPC denied the company's application to supply boiler fuel gas to the Iowa Electric Light and Power Company plant at Boone, Iowa, on the grounds that coal is available.

Nothing in the Natural Gas Act gives the commission jurisdiction to withhold a certificate on the grounds of "end use" control and the holding is of greatest importance to the natural gas industry, Wesley E. Disney, INGAA counsel, asserted.

Great Lakes Lets Contract For 312-Mile Products Line

H. C. Price Company, Bartlesville, Okla., has been awarded a contract to construct 312 miles of six and eight-inch refined products pipe line for the Great Lakes Pipe Line Company.

The line will begin at Sioux Falls, South Dakota, run to Marshall, Wilmer and Alexandria, Minnesota, and then west to Fargo and north to Grand Forks, North Dakota.

The Great Lakes Pipe Line Company system starts at Okmulgee, Okla., and runs north to Sioux Falls and Minneapolis and across to Chicago.

Humble Awards Contracts for Gasoline Products Carrier

Contracts have been awarded for the construction of Humble Pipe Line Company's gasoline products line from Baytown to a point in the Fort Worth-Dallas area.

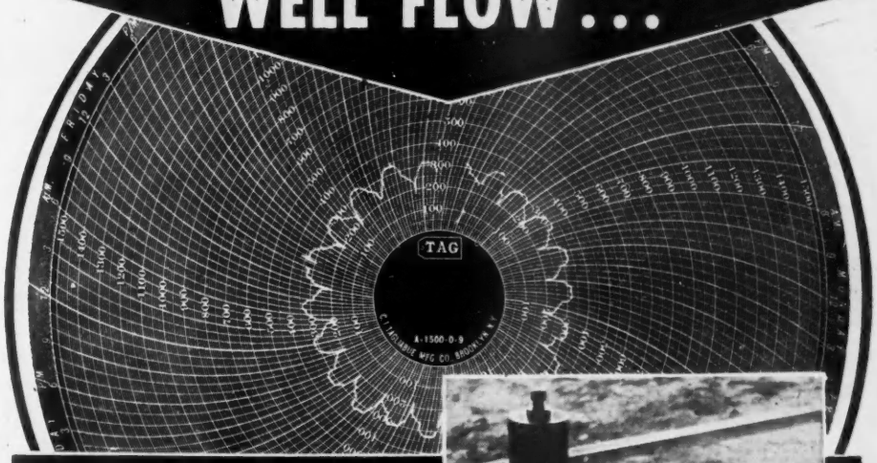
France Construction Corporation of Corpus Christi received contract to lay 127 miles of eight-inch pipe from Baytown to Hearne. O. R. Smith Construction Company of Fort Worth was awarded contract for 150 miles of eight-inch from Hearne to the terminal.

Total cost of the line, including Humble Oil & Refining Company storage and other facilities at terminals along the route, is estimated at $3 million.

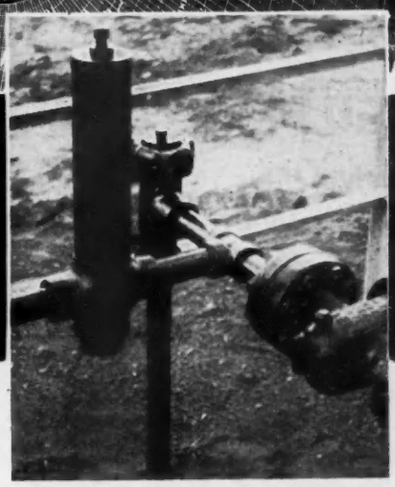
Placid's Gilbertown Field Line Is Near Completion

Placid Oil Company of Dallas is nearing completion of its 11-mile, eight-inch crude line, extending from the Gilbertown field, Choctaw County, Alabama, to a terminal on the Tombigbee River. The oil will be moved via barges from this point to the company's asphalt refinery near Tuscaloosa. Construction of the 2500-barrel capacity plant has not progressed beyond the foundation stage due to the delayed delivery of equipment.

WATCH THE REGULAR WELL FLOW . . .



. . . WHEN THE OMSCO WELL PURGER TAKES OVER



Notice the regular action on this chart of the Omsco Well Purger when tubing pressure drops! Automatically . . . night or day . . . whenever tubing pressure drops to any selected point, the Omsco Well Purger kicks off, the fluid head is produced and the well purger closes when tubing head pressure builds back up, restoring normal flow. That's how the Omsco Well Purger constantly protects your well from being killed by excessive heads of oil or water. It saves time, trouble and assures longer life for your well because the Omsco Well Purger *accurately* and *promptly* regulates flow to your specification!

The Omsco Well Purger is the *original* well purger! It operates entirely by tubing head pressure. It is designed for the specific job of prolonging the life of critical wells. And the simplified design, compactness and minimum parts assure longer, dependable service. Put this mechanical switcher to work on your critical wells. Buy it through your supply store or write Omsco, Houston.

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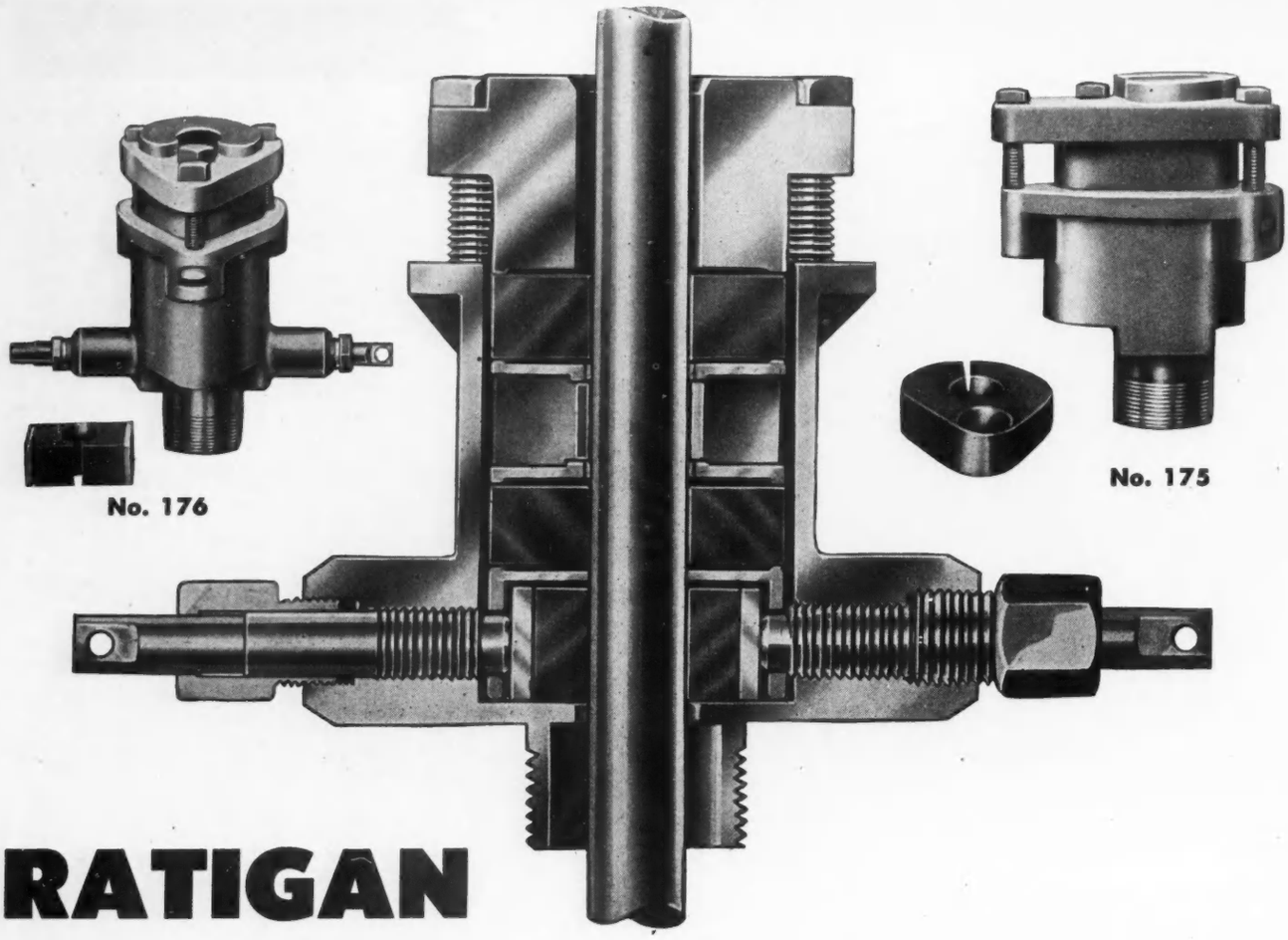

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receive their lubrication direct from the pumping well . . . they are SELF-OILING

The Ratigan No. 175 and No. 176 are the only self-oiling stuffing boxes on the market, receiving their lubrication direct from the pumping well.

They both function exactly the same except that the No. 175 has no shut-off feature. The hole in the rubber is made for the size of the polished rod; while the holes in the metal parts of the body are larger. This design makes the polished rod self-aligning.

The inside of the box is removable, so that the device has two oil chambers. Another arrangement inside the body keeps the two chambers filled with fluid from the well. This method of self-lubrication, without depending on the human element, is an excellent feature in itself. The Ratigan No. 176 Stuffing Box can be shut off while repacking the box, by tightening the screws evenly in the shut-off; but caution must be exercised as the screws will have to be loosened before the well starts to pump. If not, the fluid will not get up into the stuffing box.

When the screws are not tight against the rubber, the stuffing box is free to function properly. For a further check on the fluid coming up through the bypass, the pumper may loosen the plug in the cap a little, and if the bypass is free the oil will flow immediately. If the oil does not come through, the screws in the shut-off are too tight.

When repacking Ratigan Stuffing Boxes, both rubbers must be removed. Instruction for installing are supplied to oil companies and supply stores on request, and are attached to each box on all foreign shipments. Specify size and type of thread, and size of polished rod when ordering.

J. P. RATIGAN

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RATIGAN PRODUCTS ARE SOLD THROUGH LEADING SUPPLY STORES

☆ California

Cymric Test Is Producing From Point of Rocks Sand

Superior's producer in Point of Rocks sand at Cymric is first well in San Joaquin Valley to produce commercially from this zone; Los Angeles City Council approves drilling of 900-acre tract near Airport by 6 major companies; Richfield starts another well in East Los Angeles field; deep showings to be tested in Casmalia wildcat; Amerada has showings in Solano County gas test.

Kern County: The Superior Oil Company completed Woody 77-22 in 22-29s-21e, Cymric field, in Point of Rocks sand (Eocene) flowing 200 barrels of 45-gravity oil through a 19/64-inch choke. Depth is 5340 feet, with top of Point of Rocks placed at 5038 feet. This is the highest gravity oil produced in the field.

The completion is regarded as more than just the discovery of a new zone in the Cymric field. The well is the first commercial producer from this sand in the San Joaquin Valley. Attempts to produce from the Point of Rocks sand in the McDonald Anticline and Pyramid Hills areas resulted in 10 and 15-barrel wells. Other Cymric wells have been wet in this zone.

Another Cymric completion was Union Oil Company's Anderson 26-2 in 26-29s-21e, which was brought in from Basal Etchegoin flowing 246 barrels of 28-gravity oil through a 14/64-inch choke. Total depth is 6605 feet plugged to 3725 feet.

Following quickly on its new oil discovery a fortnight ago in the Sheep Springs or Temblor area, Independent Exploration Company has staked Temblor 3 in 17-29s-21e, a location southeast of the discovery. A mile west of the discovery Gene Reid Drilling Company has staked Anderson 26, wildcat in Sect. 18.

As a result of the westerly extension of Elk Hills through the completion by Standard Oil Company of California, operating for the Navy, of 44-24Z in 24-30s-22e, W. T. Woodward has taken over the abandoned McDonald, Burns and Norris 6 in 36-30s-22e and will deepen to the zone from which the Navy well is producing.

Los Angeles County: As a culmination of negotiations started during the war when California oil companies were exploring every possibility for developing new production, the Los Angeles City Council will designate a 900-acre tract adjoining the Los Angeles Municipal Airport on the west as an oil drilling district.

The property is owned by 6 companies—Shell, Tide Water Associated Oil Company, The Texas Company, Standard, Richfield Oil Corporation, and Union. According to the terms of the deal with the city, the oil companies gave the city an option on the property at 970 an acre, with the companies retaining the mineral rights. The city needs the property for the expansion of its airport facilities but the oil companies were unwilling to sell outright as the acreage is regarded as potentially productive. Drilling activity, if oil is discovered, will not interfere with the airport development as it will be confined to the west end of the property, away from the airport proper, with wells to be whipstocked under the east end of the acreage, if necessary. The city derives no royalty from any oil recovered.

In the East Los Angeles field, Richfield, discoverer of the field, has started Edison 1 in 16-2s-12w, some distance from its Vail 1 producer, also in Sect. 16.

Tulare County: A new test for gas is under way in the Trico area, where Central Pacific Oil Company is drilling Finch 3, 36-23s-22e, below 2730 feet. In the same area Trico Oil & Gas Company is preparing to deepen abandoned Lee 1 in 17-24-23 to a lower zone.

Solano County: Amerada is preparing to make a test in Millar Community 2, wildcat in 2-6n-2e. Casing is cemented on bottom at 4630 feet and will be gun perforated opposite showings.

Santa Barbara County: Bel-Air Oil Company will make a test in its Casmalia wildcat, Arellanes 2 in 13-9n-35w. With total depth 5960 feet, plug has been set at 4800 feet. Operator intends to test the interval 4090-4800. Production here would constitute a discovery.

In the Santa Maria Valley field, General Petroleum Corporation has located Jand 2 in 21-10n-34w to try for production on the north edge of the field. Jand 1, a location west, is pumping water with a trace of oil.

☆ Oklahoma

Cimarron County's Keyes Sector Is Given New Well

Keyes sector gets new well; leasing play centering around Sohio's Garvin County wildcat; Chitwood pool extended a mile; Sivells Bend field of North Texas extended across Red River to Oklahoma.

Cimarron County: Oklahoma's Panhandle had promises of a new well in The Pure Oil Company's Jermyn 1, SW SW SW 18-5n-8eCm, which flowed 404 barrels of oil with a little mud and salt water in a 21-hour test through 5½-inch casing. Gas was gauged at 2,200,000 cubic feet a day. The Keyes sector well was drilled to 4906 feet and plugged back to 4892 feet. This well is on an 80,000 acre solid lease block held by

Wells Completed in the United States in Week Ended March 30, 1946

Data preliminary and subject to revision. Revised and more complete data on all completions shown in monthly summary of drilling, published in second or third issue of each month. More detailed data on wildcats published in third or fourth issue of each month.

State or District	FIELD COMPLETIONS: New Wells *Oil	Gas	†Input	Dry	Total	Old Wells Deepened	WILDCAT COMPLETIONS *Oil	Gas	Dry	Total	ALL COMPLETIONS: This Week	Last Week	Cumulative: This Year	Last Year
Alabama	....	....	....	....	....	....	....	....	1	1	1	....	5	4
Arkansas	2	....	....	....	2	1	....	....	1	1	4	....	40	28
California	38	1	....	....	39	1	....	....	5	5	45	37	463	507
Colorado	2	....	....	....	2	....	....	....	....	....	2	1	24	7
Florida	....	....	....	....	....	....	....	....	....	....	....	....	5	4
Georgia	....	....	....	....	....	....	....	....	....	....	....	....	1	2
Illinois	21	....	....	8	29	1	1	....	5	6	36	39	429	397
Indiana	4	....	....	1	5	....	....	....	2	2	7	9	72	67
Iowa	....	....	....	....	....	....	....	....	....	....	....	....	....	1
Kansas	20	5	....	5	30	2	1	....	4	5	37	50	504	347
Kentucky	5	1	....	2	8	....	1	....	4	5	13	8	117	119
Louisiana	10	2	....	9	21	....	3	....	8	11	32	11	304	222
North Louisiana	6	2	....	....	8	....	....	....	4	4	12	8	153	67
South Louisiana	4	....	....	9	13	....	3	....	4	7	20	3	151	155
Michigan	3	1	....	1	5	....	....	....	4	4	9	10	166	160
Mississippi	2	....	....	....	2	....	....	....	4	4	6	2	59	90
Missouri	....	....	....	....	....	....	....	....	....	....	....	....	4	10
Montana	1	....	1	1	3	....	....	....	1	1	4	3	56	49
Nebraska	....	....	....	....	....	....	....	....	....	....	....	....	....	2
New Mexico	9	....	....	3	12	....	....	....	1	1	13	4	101	124
New York	15	....	10	....	25	....	....	....	....	....	25	25	247	201
Ohio	4	6	5	9	24	....	....	....	....	....	24	....	217	176
Oklahoma	26	3	....	12	41	5	1	....	5	6	52	48	632	552
Pennsylvania	29	4	15	....	48	....	....	....	....	....	48	42	656	661
Tennessee	....	....	....	....	....	....	....	....	....	....	....	....	1	....
Texas	73	3	....	26	102	5	7	....	26	33	140	205	1,930	1,694
E.Tex.Bor. Co.'s	....	1	....	....	1	....	....	....	....	....	1	4	44	20
Rest of E. Texas	6	....	....	1	7	....	1	....	4	5	12	15	126	47
North Texas	21	....	....	11	32	1	....	....	9	9	42	56	542	376
W. Central Tex.	1	....	....	2	3	1	2	....	1	3	7	18	154	89
West Texas	28	....	....	....	28	1	....	....	2	2	31	49	407	456
Tex. Panhandle	2	2	....	3	7	2	....	....	....	....	9	8	114	145
G. Coast, Upper	5	....	....	2	7	....	3	....	2	5	12	13	170	171
G. Coast, Lower	7	....	....	2	9	....	....	....	3	3	12	27	250	249
Southwest Texas	1	....	....	5	6	....	....	....	....	....	6	12	90	120
S. Central Tex.	2	....	....	....	2	....	1	....	5	6	8	3	33	21
West Virginia	....	11	....	....	11	2	....	....	....	....	13	....	156	185
Wyoming	1	....	....	....	1	....	....	....	....	....	1	3	39	38
Total U.S.	265	37	31	77	410	17	14	....	71	85	512	497	6,228	5,647

* Includes distillate wells. † Includes salt water disposal wells.

Pure and there are 2 gas wells, 3 oil wells and 2 dry holes on the block.

Garvin County: A royalty play has been going at a spirited pace around Sohio Petroleum Company's Howard 1, SE SE NW 17-1n-2w, tight wildcat. Prices have been reported running as high as $100 an acre around the well.

Grady County: The Chitwood gas-distillate pool was extended a mile south of the discovery well with Magnolia's Britt Unit 1, SE NW SW 3-4n-6w, which tested 14,400,000 cubic feet of wet gas in a drill-stem test from 10,645-984 feet. Gas in the Britt 1 is described as being richer than that of the discovery well, which flowed 434 barrels of distillate in 26½ hours through ½ and ¼-inch tubing chokes.

Love County: It appears that the Sivells Bend pool of Cooke County, Texas, has been extended across the Red River into Oklahoma with The California Company's Wright 1, wildcat in CNE NW 13-8s-1w, Love County, Oklahoma. A drill-stem test made with packer at 6180 feet was opened for 15 minutes and showed gas immediately with the volume increasing during the test. Breakdown showed 270 feet of clean oil and 540 feet of oil cut mud. The Wright 1 is 2 miles from the nearest Sivells Bend producer and markers are checking about flat with the highest wells in the Sivells Bend area. The well is on a 3000-acre river bottom ranch which The California Company has leased.

Major County: The Superior Oil Company of California's Manning 41-27, NE NE NW 27-22n-10w, southwest of Ringwood in Major County, had 3 shows of oil besides the basal Pennsylvania sand from which it produces, recently released data indicates. The wildcat, drilled in 1945 and tested until early in 1946, now produces 35 barrels of oil per day. Cuttings from the Oswego lime at 6313-17 feet showed fair porosity and stain A core from 6652-57 feet showed a small amount of gas bubbling from pinpoint porosity and had a good odor. A core from the Hunton lime at 7698-99 feet had gas bubbles, fair porosity and good stain. Total depth was 8274 feet with plug back to basal Pennsylvania sand for pay at 6700-34 feet.

☆ Kansas

Ellis County's Nicholson Pool Has Second Producer

Nicholson pool of Ellis County gets second producer; Northern Rooks County wildcat staked by Martin & Brunson; Stanolind trying to shut off water in Seward County wildcat; Curtis pool of Stafford County gets food producer.

Ellis County: Continental Oil Company has completed the second well for the new Nicholson pool. The Nicholson "A" 1, NE NE SW 30-11-20, was assigned a potential of 428 barrels of oil per day with production from Arbuckle, topped at 3835 feet. Total depth is 3858 feet. The discovery well for the field was completed in November, 1945, for 446 barrels a day.

Rooks County: A new wildcat has been staked in northwestern Rooks County by V. D. Martin, Howard Brunson and others. The well is the Jones 1, NE NE NE 3-6-19w, 7 miles east of the Southeast Ray pool on a 350-acre block.

Seward County: A plastic plug has been set in Adams Gas Unit 1, C N½ S½ NW 14-35s-31w, as Stanolind Oil & Gas Company attempts to shut off water in the bottom 14 feet of the hole. The well was plugged back to 6190 feet and operators planned to test for gas but were halted because of water in the bottom of the hole. A drill-stem test at 6147-87 feet recovered 50 feet of gas-cut mud. Pipe was set to 6145 feet to test. The Lansing was topped at 4526 feet and Mississippi at 6196 feet.

Stafford County: The east side of the Curtis pool in Stafford County received a good well when Tom Allan's Wilson 2, SE NE SE 1-22s-14w, swabbed 44 barrels of oil per hour. The field well was drilled to a total depth of 3707 feet in the Arbuckle and acidized with 500 gallons before the swab test. This well is the seventh producer for the pool which was discovered in November, 1942.

☆ New Mexico

East Side of Hardy Field Has Flowing Yeso Production

Flowing production from the Yeso developed on east side of the Hardy field. Ellenburger project in Brunson area passes up oil show from Yeso. First Ellenburger test in Drinkark field testing.

Lea County: Humble Oil & Refining Company's Hardison 1-B, SE NW 34-21s-37e, east offset to regular Permian production in the Hardy field and 1½ miles northwest of the Paddock 5100-foot Glorietta area, headed oil through the pay to 6572 feet and pipe set 1 foot off bottom to complete through perforations. This test entered the Glorietta at 5090 feet, correlating flat with nearest Paddock field wells, but tested water with show of oil and gas from this zone.

Magnolia Petroleum Company's Brunson-Argo 11, NE NE 9-22s-37e, east outpost Ellenburger project for the Brunson sector of the Penrose-Skelly field, emphasized the Yeso production outlook for the area when a drill-stem test at 6405-78 feet yielded gas to the surface within 5 minutes at a rate of 870,000 cubic feet daily. A steady flow of oil followed in 17 minutes. Second test at 6456-6575 feet netted about same volume of gas with 1260 feet of heavily oil- and gas-cut mud. Drilling was under way at 6610 feet to explore the Ellenburger. Rowan Drilling Company et al's Elliott 2-B-9, C NW NW 0-22s-37e, twin to an Ellenburger producer and deepened from regular Permian at 3733 feet, was showing mostly water after repeated perforations of Glorietta topped at 5065 feet with elevation of 3427 feet.

Lion Oil Company's Wylie 1, SN NW 5-23s-38e, south end of the Drinkard multi-pay field and a failure in the Yeso, was attempting to run tester in Ellenburger at 8421 feet. The Devonian, topped at 7450 feet, and the McKee sand Simpson, entered at 8041 feet, were barren. Previous attempts to reach pre-Permian beds in this area have been blocked by granite.

☆ West Texas

North Goldsmith Field Has Flowing Devonian Discovery

The North Goldsmith field scores flowing discovery in Devonian; Andrews County semi-wildcat shows for producer in Basal Permian, while 2 wildcats on west side of county have nominal oil shows. Kent County deep strike takes in more Ellenburger pay; Hale and Reeves counties have interesting wildcats.

Ector County: Stanolind Oil & Gas Company's Grisham-Hunter 1, C SW SW T&P Ry. 10, Block 45, T-2-N, offsetting regular Permian production in the North Goldsmith 8-well field, entered the Devonian cherry-lime pay at 7919 feet and flowed oil at the rate of 15 to 20 barrels hourly when tester was used at 7944 feet. The well yielded gas to surface within 4 minutes, and began flowing oil within 51 minutes. It is scheduled to drill through the 500-foot section of Devonian before attempting completion, but may fulfill the original 8700-foot depth contract assumed in the purchasing of 3416 acres in the area last summer from the Grisham-Hunter Interests for $468,437.50 cash and $100 per acre additional from ⅛ of the ⅞ minerals.

This second Devonian strike for the county is 1¼ miles east by north of Stanolind's Williamson 1, which tested nominal shows of oil and gas with water from Ellenburger at 10,198--10,290 feet, and is preparing to plug back from water in the Silurian, topped at 8555 feet. Williamson 1 entered the Devonian at 8045 feet, or 63 feet low to the pending new-pay discovery, and will attempt to complete from shows in this zone. The Devonian producing area will likely be greater than the Permian field.

Phillips Petroleum Company's Eidson-Scharbauer 1, ¾-mile west of the north end of the Penwell field and high structurally with indicated production in the Glorietta (Holt) and Silurian, was making a drill-stem test of promising shows in Basal Simpson at 8660-8700 feet. Production from the Ellenburger is generally conceded to be in prospect.

Stanolind's Scharbauer 3-Q, Ellenburger failure for the north end of the Goldsmith field, increased its flow to 402 barrels of oil on 24-hour test through ¼-inch choke after using 5000 gallons of acid through Clear Fork (Tubb) perforations at 6090-6185 and 6200-90 feet. This deeper pay discovery paves the way for twin drilling.

Andrews County: Skelly Oil Company's University 1-Z, C NW NE Sect. 10, Block 11, 2¼ miles south by west of the Martin 4-pay field and the same distance northeast of the Three Bar 2-well Devonian field, has registered flowing oil production from the Basal Permian, which yielded nominal shows in the 2 fields. A drill-stem test at 7522-65 feet returned 495 feet of oil and 90 feet of oil-cut mud, while a test at 7565-7636 feet produced gas to the surface within 5 minutes and then flowed 34.4-gravity oil at a rate of 50 barrels hourly. The stem recovery included 270 feet of sulphur water, thus raising possibility of having drilled to water. This 8500-

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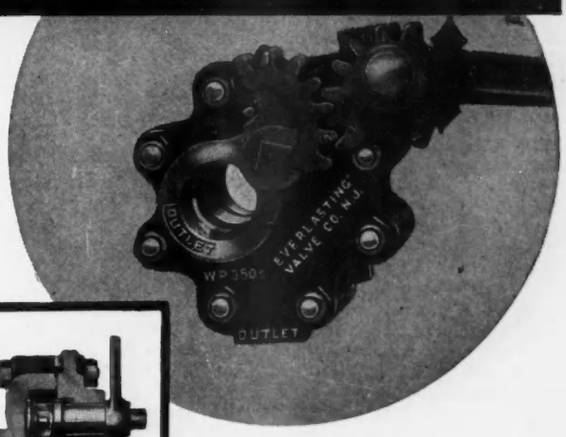

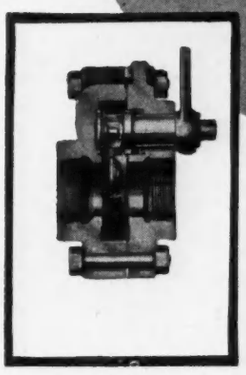

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foot depth obligation test was drilling at 7730 feet to explore the Devonian, which is absent in the Martin area.

Sun Oil Company's Martin 2, north offset to the McKee (Simpson) pay discovery for the Martin field, entered the Simpson at 8460 feet, or 88 feet low, and is 101 feet low on the McKee, which yielded 90 feet of oil, 180 feet of rotary mud, and 90 feet of salt water. However, this test showed as a prospective producer from the Silurian, and if tapped would be a fourth oil zone. The Atlantic Refining Company and Phillips Petroleum Company's University 1-A-11, which shifted the apex of the Ellenburger structure 1 2/3 miles southeast by heading oil through testing tool at 8310-8440 feet, was to resume coring at 8940 feet to penetrate the section, topped at 8670 feet, or 144 feet high, before running pipe.

Humble Oil & Refining Company's Gaines 1, C NE NE PSL 14, Block A-39, an Ellenburger prospect on a 1248-acre lease expiring in May, logged nominal show of oil in San Andres at 4450-60 feet, and will run protection string of 9-inch casing. Shell Oil Company's Nelson-Humble 1, C NE SE PSL 8, Block A-40, was making a drill-stem test of broken zones of saturation and porosity in Ellenburger at 10,401 feet. The Simpson was topped at 9660 feet, or 538 feet high to a 10,929-foot granite failure 1¼ miles west by south. Placid Oil Company and Gulf Oil Corporation's Thornberry 1, an Ellenburger prospect and 2¾ miles southeast of a 10,414-foot Silurian failure, entered barren Devonion at 9685 feet, or 475 feet low, and was drilling at 9779 feet.

Humble's Cowden 1, 11/16-mile southeast of the Dollar Hide 2-well Devonian area, was drilling shale at 9100 feet, having entered the Pennsylvanian, which is not present in the field, at 8515 feet. This outpost correlates 618 feet low on the Tubb. Magnolia Petroleum Company's Cowden 1-B, Ellenburger project, plugged back from 7266 to 6855 feet because of being 10 degree off vertical.

Stanolind's University 4-O, ¾-mile northwest of the Ellenburger discovery for the Fullerton-Devonian field, entered the Montoya at 9810 feet, or 31 feet low, and was drilling Basal Simpson sand at 10,465 feet.

Winkler County: Stanolind's Taylor 1, east outpost for the Keystone field and first Ellenburger failure for this side of the structure, was showing for a first producer in the Devonian, which has indicated flowing production through tester in the main field. Perforations at 8040-8135 feet yielded 152 barrels of oil on 13-hour swabbing and flowing test, then the well flowed 152 barrels of oil on 11-hour gauge. Gulf's Keystone 69-E, previously listed as having made prolific gas and condensate flow from weathered granite below the cased-off Ellenburger section, thereby confirming a new and deeper production source, was making a drill-stem test at 9865 feet.

Hale County: Stanolind's Irish 1, C NE NE HE&WT Ry. 18, Block D-T, projected 8000-foot Ellenburger test and 5 miles east of the Anton 6-well pumping area, resumed coring after recovering 50 feet of fair to dense oil-cut mud from the Clear Fork at 5543-5700 feet. This wildcat entered the San Andres at 3185 feet and the San Angelo at 4135 feet with elevation of 3428 feet.

Hockley County: Humble's Campbell 1, a mile south of the Anton pool and an Ellenburger project, was running protection string of pipe after losing circulation in dolomite at 9145 feet. The San Andres was entered at 3300 feet and the San Angelo at 4715 feet with elevation of 3440 feet.

Reeves County: Argo Oil Corporation's Roberts 1, C NW SE H&GN Ry. 294, Block 13, partially confirmed nominal showings logged below 9941 feet when a drill-stem test at 10,018-047 feet yielded 60 feet of distillate with show of gas. This wildcat entered the Delaware lime at 5147 feet and the Leonard, which has been reached by comparatively few Delaware Basin tests, at 7840 feet.

Kent County: Humble's Vick 1, C NW NE H&GN Ry. 45, Block 5, which has confirmed commercial oil production from the Ellenburger, topped at 7773 feet, was making a drill-stem test at 7846 feet, and is due to deepen to water before running pipe for completion. First test at 7812 feet yielded 2336 feet of 36.3-gravity oil, and the well headed oil when stem was being pulled. Second test at 7816 feet returned 2985 feet, or 25 barrels, of 36.6-gravity oil, with heads occurring in coming out. A third test at 7812-30 feet yielded only 20 feet of rotary fluid. It is the initial strike for the county, and 7 miles east by south of the Justiceburg regular Permian area. It is an important discovery for the east side of the Permian Basin, opening up a big area for further prospecting, and is about 100 miles from nearest Ellenburger production in Shackelford County.

40-Acre Spacing Granted

The State Corporation Commission of Oklahoma has granted 40-acre well spacing for the Bartlesville sand zone of the South Moore and West Moore fields of Cleveland County, Oklahoma.

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☆ North Texas

New Oil Zone Is Registered By Clay County Deep Area

Clay County deep area gains new oil zone; Montague County wildcat fulfills earlier outlook for a big well; pipe set for production test of Foard County prospect; Jack County has small pumping discovery.

Clay County: L. T. Burns et al's Ford 1, SEc NE Sec 3221, TE&L Co. Survey and ⅜ mile northwest of the Ellenburger discovery for the Heard pool, flowed 189 barrels of oil on 12-hour test through ½-inch choke after using 1000 gallons of acid through perforations at 5751-61 feet in Bend, topped at 5751 feet, or 46 feet low. This new-pay discovery was plugged back from 6701 feet, having tested dry in the Ellenburger, topped at 6535 feet, or 102 feet low. Panhandle Refining Company's Segler 1, a mile northwest, was abandoned at 6509 feet without shows, although the Bend was entered at 5707 feet and Ellenburger at 6445 feet, correlating 2 feet high and 68 feet high, respectively, to Ford 1. Continental Oil Company's Edwards 1, southwest offset to its Ellenburger discovery, was drilling shale 6460 feet, having entered the Bend at 5770 feet, or 38 feet low to the Ellenburger well.

Montague County: L. S. Youngblood and R. L. Foree's Benton 2, Abel A. Lewis Survey and 2¾ miles south of nearest production, flowed 261 barrels of oil, with gas-oil ratio 1500/1, on 3-hour natural test through ¾-inch tubing choke from Bend conglomerate perforations at 6132-42 feet. It is a ¼-mile northeast offset to a failure on this subsurface and geophysical prospect, which will be known as the Caudle field. Development of the area is to be on a conservative basis.

Foard County: Magnolia Petroleum Company's Steele 1, NW SW SW H&TC Ry. 307, Block A, 7 miles southeast of Crowell, cemented 5½-inch casing at 5601 feet after testing water in the Ellenburger at 5630-82 feet, and will try for completion in 5300-foot Bend conglomerate.

Jack County: Stephens Petroleum Company's Jackson 1, near C NW W. C. Ry. 1, A-904, 1½ miles east of the Cherryhomes pool, pumped 4 barrels initial from conglomerate at 4717-27 feet in Bend, topped at 4680 feet, having plugged back from 5253 feet to 4875 feet.

Cook County: Jim L. Anderson and Burk Royalty Company's Holcomb 1, A. C. C. Bailey Survey, extended the Lower Strawn pay for the Wilson field northwest; it pumped 29 barrels of 25-gravity oil from perforations at 4089-93 feet. This outpost was reworked after being abandoned as a failure in Ellenburger at 4138-4303 feet in 1943.

Repressuring Permit

Permission to repressure the Cromwell sand in a portion of the East Cromwell pool of Okfuskee County, Oklahoma, has been granted C. W. Titus and others by the State Corporation Commission. The Corporation order granted the applicants permission to inject gas in that part of the field located in Sects. 25, 26 and 35-11n-8e.

☆ East Texas

Reworked Cherokee County Wildcat Triples Early Flow

Reworked Cherokee County wildcat triples initial flow; Anderson County deep prospect has fishing job; second scheduled oil test for north flank of the Opelika field correlates favorably.

Van Zandt County: Delta Drilling Company et al's Martin 1, A. T. Flowers Survey and 4 miles south of Tundra, entered the Georgetown at 5330-60 feet by samples, with elevation of 535 feet, and was drilling lime and shale at 6150 feet. V. J. Meyer and Danciger Oil & Refineries, Inc.'s Meridith 1, R. C. Morris Survey and 3 miles west of Edgewood, logged first anhydrite stringer at 6668 feet, and was drilling shale and lime at 7753 feet. This Travis Peak prospect is reported to be checking favorably for the area.

Cherokee County: Humble Oil & Refining Company's Curtis 1, John Vaughn Survey and discovery well for the Larissa faulted structure, flowed 1119 barrels of 47.8-gravity oil with gas-oil ratio of 3990-1 on re-test through ¼-inch choke from Pettit perforations at 10,160-10,212 feet. This strike was drilled to Travis Peak at 10,611 feet, and completed in September, 1942, flowing 37 barrels of 48-gravity oil with gas-oil ratio of 1811/1 through ¼-inch choke from the Pettit, establishing producing depth-record for the district. Two failures were later drilled by the company after unitizing the block. The increased flow by the discovery may result in revived explorations of the large structure.

Anderson County: Humble Oil & Refining Company's Freeman 1, Brushy Creek prospect that passed up high-pressure gas show in the James lime at 11,545 feet, was fishing for drill-pipe at 11,869 feet.

Henderson County: Lone Star Producing Company's Hearne-Magnolia 1, 3500 feet north by west of gas-distillate production in the Opelika field, was drilling at 6485 feet in Georgetown, topped at 5540 feet.

More Than 400 Are Expected At Scouts, Landmen's Session

An attendance of more than 400 is expected at the annual convention of the National Oil Scouts and Landmen's Association held in Jackson, Miss., May 23, 24 and 25. This will be the first convention ever held by the association east of the Misisippi River, and the first full convention since 1941 Ray Stevens of Shell Oil Company, president of the Mississippi Oil Scouts Association, expects a record attendance.

Opening day will be taken up largely with registration with formal opening ceremonies to be held on the day following. The remainder of the convention will include open meetings at which recognized authorities will discuss various oil topics.

Oklahoma Leases Sold

Leases on state school lands in the Panhandle of northwestern Oklahoma brought $24,859 for the school system during a recent sale of 12 tracts in Texas County, totaling 2189 acres. J. E. Woods, Kansas City, paid $19,130 for leases on seven tracts, totaling 1389 acres, to be one of the most successful bidders. During the same sale, the state school land commission sold leases on small tracts in Lincoln County, for a total of $2432, and seven tracts in Stephens County were sold for $12,718.

☆ East Texas Border

South Offset in Waskom Field Flows Some Oil and Water

Offset in Waskom field flows some oil and water; completion attempts made in Marion County well; Skelly plans Carthage activity.

Harrison County: Arkansas Fuel Oil Company's Abney 1, Bryant Survey, on the southwest side of the Waskom field, being 2 miles from the town of Waskom, was flowing some oil and wash water into pits, and was cleaning out. Preparations were being made to place the test under gauge.

Marion County: Magnolia Petroleum Company's Orr 1, Fowler Survey, in the northwest portion of the county, considered a promising Travis Peak oil discovery, was setting 7-inch casing to 10,153 feet in the Cotton Valley. Tanks were up for completion attempts.

Shelby County: Humble Oil & Refining Company's Pickering Lumber Co. 1, Francois Survey, Huxley sector, was

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flowing gas and condensate from perforations at 6006-26 feet. Total depth is 12,221 feet. The well had made 18 barrels of distillate daily through 3/16-inch choke, with 1,800,000 cubic feet of gas at that level. The well has been approximately one year in the drilling.

S. C. Cochran reputedly has agreed to drill within a year a wildcat test in the Lindale area, on the Elnora Woods tract, James Hazell Survey, and Sinclair Refining Company is reported arranging to drill within a year on the W. L. Pierce tract, M. L. Hemphill Survey.

Panola County: Outlook for the Carthage field was materially brightened by Skelly Oil Company's Werner D-1, Wm. G. Anderson Survey and a 2-mile extension of the field, which on recent potential test gauged 480 million cubic feet of gas daily. Skelly officials estimated the flow as being approximately 100 million cubic feet greater than any previous gasser. The well is about 3 miles north and 9 miles east of the town of Carthage and is 2 miles north of Skelly's 1-A, Willis Vaughan Survey, nearest production. Skelly has more than 50,000 acres in the vicinity and plans brisk operations in the near future.

☆ South Central Texas

Pearsall Pool of Frio County Is Given North Extension

Production extended in Pearsall pool ½-mile north; Humble prepares for completion in Charlotte outpost test; sidewall samples indicate gas sands in Valley Wells area widcat; Carrizo Park area test prepares for production try.

Frio County: Highland Oil Company's Rosebud Melms 4, ½-mile north of production in the Pearsall pool, A. C. Alexander Survey, has extended production in that field with a completion flow of 80 barrels of 26-gravity oil daily through a 7/32-inch choke from perforations at 3930-39 feet. Gas-oil ratio was 1200/1 and tubing pressure gauged 260 pounds while the casing gauged 620 pounds while flowing. Total depth is 3943 feet with 5½-inch casing set on bottom.

Atascosa County: Humble Oil & Refining Company's E. M. Chylek 1, Charlotte outpost test in the Antonio Estrada Survey 53, 3100 feet northeast of the company's Johnson 1, which extended production in this pay 3750 feet, and 3200 feet southeast of the Edwards lime production, has set 5½-inch casing to a total depth of 5127 feet in shale for completion in the 5000-foot pay horizon.

Dimmitt County: Howard & Wheeler's Sarah Henrichson 1, wildcat 2 miles southeast of Valley Wells, in lot 5 of Block 15, Good Luck Colony Subdivision, drilled to 5230 feet then was taken over and deepened to 5280 feet by Barnsdall Oil Company, which set casing for production tests. An electric log was run to 5230 feet with indications shown at 3994-4034 feet and confirmed by sidewall samples which showed a gas sand, and at 5214-31 feet which showed sands with an oil odor. Both were taken in the Wilcox zone.

Humble's Mogford & Kimble 1, wildcat in the Carrizo Park area, 2 miles south of Carizzo Springs, on a 483.5-acre tract in the Trinidad Sanchez Survey A-665, set 5½-inch casing to 2800 feet and was preparing for production test. An electric log was run to 2992 feet and side wall samples taken. The well was drilled to 3002 feet before setting production pipe.

Texas Field Named

The name Glendale has been given to the field discovered by Magnolia Petroleum Company's Bolton 2, Henry Bond Survey, Trinity County, Texas, according to an announcement by A. J. Baurenschmidt, chairman of the Nomenclature Committee of the Houston Geological Society.

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☆ Southwest Texas

Webb County Wildcat Coring After Getting Gas on Test

Webb County wildcat gets gas on drill-stem test, continues to core; Adami area wildcat swabs oil on test in plugged-back hole; Starr County test cores shows of oil and gas.

Webb County: Sun Oil Company's Isaac Hirsch et al 2, wildcat test on a 2880-acre lease 26 miles northeast of Laredo, in Survey 203, and 416.8 feet northeast of the Hirsch 1 dry hole, cored below 7186 feet in the Wilcox after completing a drill-stem test at 6952-7010 feet. The test showed gas, with a working pressure of 1500 pounds and a bottom-hole pressure of 1800 pounds. The Wilcox has been cored almost solid from 6910-7020 feet. Operators plan a third test nearby.

The Texas Company's Griffin Watkins Estate 1, wildcat 4 miles southwest of the Adami field, and in the SE¼ of Block 20 of the De Lange Eiser Development Company Subdivision of the San Casimiro y de Las Fuentes Survey A-1208, swabbed a little oil while testing at the plugged-back depth of 875 feet. Previous to setting 5½-inch pipe at 863 feet, the well cored a sandy section with a show of oil at 863-68 feet. A drill-stem test made at that depth failed when the tool became plugged, and the well was drilled to a total depth of 1405 feet before it was plugged back.

Starr County: Baldridge & King's Yturria L. & L. S. Company et al 1, wildcat 1 mile northwest of the Sullivan City field on a 160-acre tract in the east half of Porcion 100, ran an electric log to 4995 feet.

☆ Lower Texas Coast

Phillips Recovers Drill Pipe In Sidetracked Wildcat

Phillips recovers drill pipe in sidetracked wildcat; Live Oak County wildcat continues to drill after setting pipe; North Minnie Bock oil discovery given potential test.

San Patricio County: Phillips Petroleum Company's Mrs. Ola McCann Unit 1, wildcat 6 miles east of Gregory on a 100-acre lease in the W. Smith Survey A-243, was reported cutting and pulling drill pipe after it became stuck while drilling at 9607 feet. The hole was previously plugged back and sidetracked at 9490 feet when a drill collar was lost at 9727 feet in the original hole. Two drill-stem tests made before sidetracking made shows. The first at 6609-16 feet recovered 150 feet of oil-cut mud, and brackish water, while another at 6609-35 feet recovered 90 feet of oil-cut mud and 720 feet of salt water. The well had a gas kick while drilling at 9327 feet.

Live Oak County: The Atlantic Refining Company's Frank P. Morris et al 1, wildcat 18½ miles southwest of George West and in the I. M. Alexander Survey A-998, was reported drilling below 6400 feet after running a log to 4000 feet and setting 10¼-inch casing at 4012 feet.

Nueces County: Atlantic's James Ewing 2, oil discovery well at North Min-

nie Bock field, in Sect. 46, George H. Paul Subdivision of the Driscoll Ranch, 3 miles southwest of Robstown and 1½ miles north of the Minnie Bock field, made a 24-hour production gauge showing substantial flow. The well gauged 188 barrels of 37.5-gravity oil, no water, on a 5/32-inch choke from perforations in the new pay at 6229-35 feet. Gas-oil ratio was 897/1 with 1126 pounds pressure on the tubing under flow and 2100 pounds on the casing. This is the second test for the area and the first oil producer. It is 1629 feet southeast of the Ewing 1, which was completed in perforations at 8254-68 feet.

DeWitt County: The Pure Oil Company's E. F. Karl 1, discovery well of first oil production in the new Yoakum field on the DeWitt-Lavaca County line, was completed in the Wilcox zone for 38 barrels net of 37.6-gravity oil and 52 percent water daily through ⅛-inch choke from perforations at 8663-65 feet. Gas-oil ratio was estimated at 20,868/1 with tubing pressure 2100 pounds and casing pressure 1100 pounds. Drilled to a total depth of 11,334 feet, the well was plugged back to 8667 feet. It is the second test in the area and is ½-mile south of the discovery well, the Eugene Rice 1, and about 3 miles southeast of the Yoakum townsite. Production in the Karl 1 is from a deeper pay zone than that in the discovery well where 52.2-gravity condensate comes from perforations at 8160-90 feet.

☆Upper Texas Coast

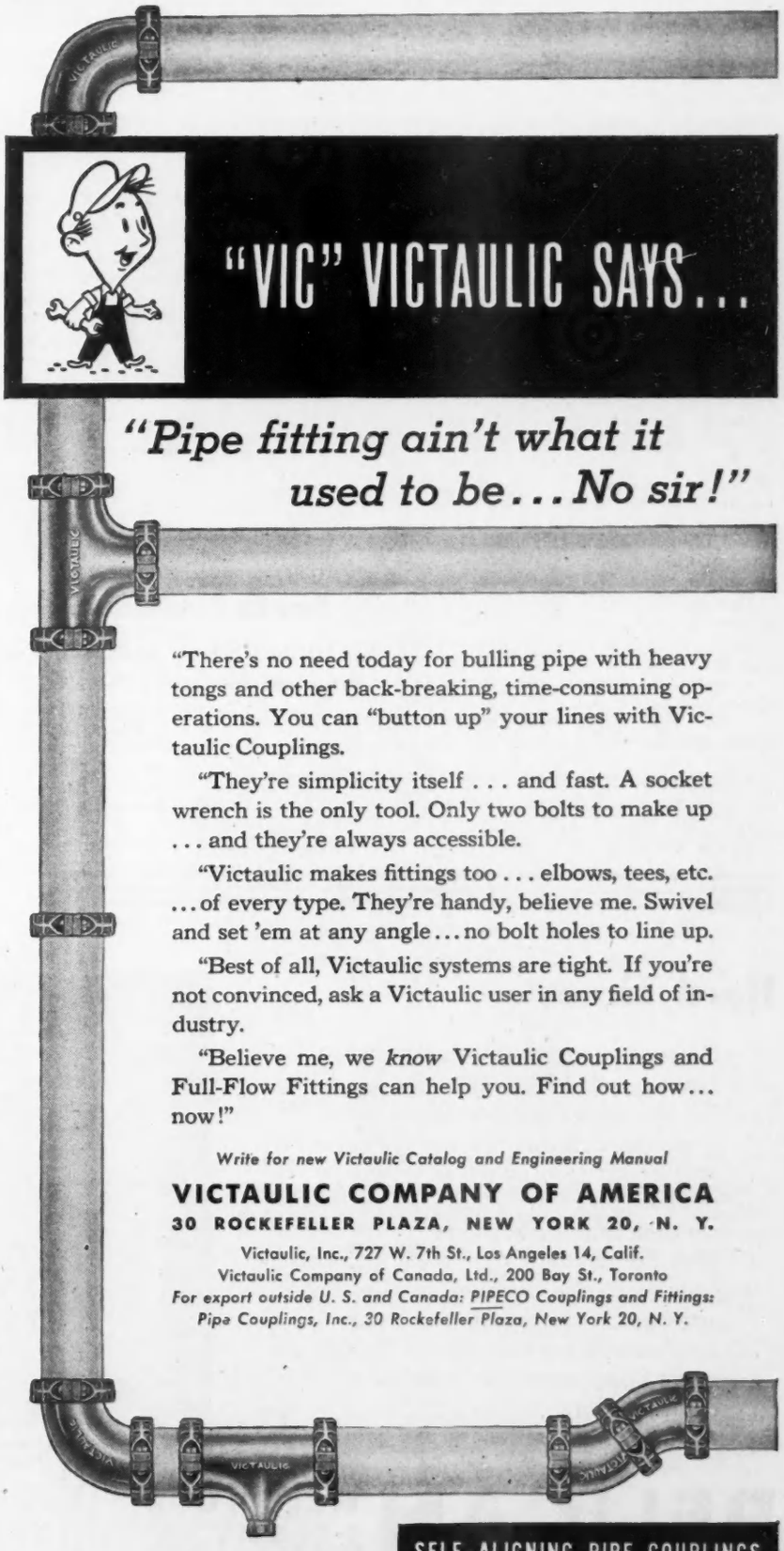
Dual Completion Is Planned For Colorado County Wildcat

Dual Completion planned for Columbus wildcat; formation data reported by Madison County wildcat; McDannald makes good gasser at Lake View; Olive confirmation test unsuccessful in core recovery; Bon Weir wildcat prepares for second production test; production test given Sugar Valley extension test in oil and gas sand.

Colorado County: Texas Gulf Producing Company's Earline Landig 1, wildcat in the James Cummins Survey, Abstract 13, and 5750 feet northeast of the discovery well at Columbus, prepared to make another test before completing. Latest test made through perforations at 7888-91½ feet showed oil and 30 percent salt water. A packer is being run for another test. Previous tests at 8464-8528 feet showed gas, condensate and some water, while another test at 8464-90 feet showed gas and condensate, no water. Through perforations at 8392-98 feet, the well flowed an estimated 110 barrels of 43.6-gravity oil and 1 million cubic feet of gas daily. Operators plan dual completion.

Madison County: West Production Company and Noranda Oil Company's H. M. Boring 1, wildcat in the Amy Boatright Survey, about 7½ miles southwest of Madisonville, is drilling below 11,385 feet in shale after picking up good oil saturation near 10,055 feet.

Wharton County: McDannald Oil Company's W. H. Mitchell 1-B, 2181 feet south of the D. T. Mitchell 1 gasser, and 2523 feet northeast of the Appling 1 gasser, G. C. Gifford Survey A-661, Lake View field, has been completed for an estimated open flow of 8 million cubic feet of gas daily, which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under a 5/32-inch choke measures 843,000 cubic feet of gas daily with 1510 pounds pressure on the tubing. The well was drilled to 6529 feet with 5½-inch pipe set at 4149 feet and perforated with 42 shots at 3972-79 feet.

Brazoria County: Rowan Drilling Company's Thomas Jamison 26, 1400 feet southwest of its No. 9 well and 1180 feet southwest of the No. 22 dry hole, was completed for a producer on the southwest flank of the Danbury dome. Salt was encountered from 6668 feet to bottom of well at 6676 feet, and was plugged back to 2657 feet for completion. The well flowed 69 barrels of 24.5-gravity oil daily through ⅛-inch choke from 55 perforations at 2636-42 feet and at 2645-56 feet. Gas-oil ratio is 102/1 with tubing pressure 260 pounds and casing pressure 320 pounds.

Hardin County: Pan American Production Company's Oliver Sternenberg Lumber Company 2, confirmation test in the Olive discovery area on the J. Landis Survey, Abstract 328, and 2665 feet northwest of the discovery well, was drilling at 10,558 feet in sandy shale after making unsuccessful core recoveries in the upper Wilcox sands.

Newton County: Humble's W. W. Moore, Jr., 1, wildcat in the Bon Weir area, A. D. Stark Survey, Abstract 384, was preparing for another deep production test. Two squeeze jobs were made above and below the zone to be tested, the top being made in perforations at 10,389-392 feet and the lower at 10,400-403 feet. Previous test was made through 84 perforations at 11,894-900 feet where the well flowed 72 barrels of fluid (94 percent salt water) in 24 hours developing only 40 pounds pressure.

Matagorda County: The Superior Oil Company of California and John H. Blaffer's Sadie E. Thomasson 1, extension test 2400 feet northwest of the Culbertson 1, an old producer, and in the P. Burnett & S. A. Sojourner Survey, Abstract 13, Sugar Valley field, was dually completed for a gas and oil producer. Oil was from a new sand for the area. The well was shut in pending hearing before the Railroad Commission for permission to produce dually. Oil production in the dual well is from a sandy formation topped at 9082 feet and through perforations at 9083-86 feet, flowing 423 barrels of 43-gravity oil and 193,000 cubic feet of gas daily through the tubing with 1350 pounds pressure. Gas production comes from perforations at 8762-72 feet where 71 barrels of 55.7-gravity condensate and 3,720,000 cubic feet of gas flow daily through the casing annulus under 3070 pounds. The gas pay sand measures from 8761 feet to 8786 feet, and the Van Vleck sand was encountered from 7900-16 feet. Current gas production in the Sugar Valley field comes from 9745-59 feet in the Peterson 1, discovery well, while oil in the Culbertson 1 produces from 8274-76 feet.

☆ South Louisiana

Johnson's Bayou Area Wildcat Prepares for Production Test

Johnson's Bayou wildcat prepares for production tests; Bon Air confirmation is made by Sohio; official potential given Bayou La Fleur discovery; Singer area wildcat continues attempts for a completion; Sun swabs North Cankton test for production test.

Cameron Parish: Continental Oil Company and Sohio Petroleum Company's Cameron Parish School Board 1, 16-15s-14w, Johnson's Bayou area, wildcat, was preparing for a production test in the 9200-foot level where a gas show was made. The well is credited with sands showing gas in the 7300-foot and the 9000-foot levels. The well was drilled to 9302 feet and 778 feet of 5-inch liner was set to bottom. Pipe was perforated from 9223-30 feet for a squeeze job in three stages with 750 sacks of cement prior to making perforations for a production test.

Jefferson Davis Parish: Sohio's Claudius Fontenot et al 1-B, 15-10s-6w, west offset to the Fontenot 1, discovery for the Bon Air field, was completed to confirm production for an initial gauge of 234 barrels of pipe line oil daily through an ⅛-inch choke with 1360 pounds tubing pressure. Total depth is 9750 feet with 5½-inch pipe set at 9736 feet and perforated in the same horizon as the discovery well, which is at 9694-9704 feet. The well is now shut in waiting on Conservation Commission potential tests.

Jefferson Parish: The California Company's E. P. Brady et al 1, 66-16s-24e, discovery well for the new Bayou La Fleur area, was completed for a Commission potential of 300 barrels of 38.7-gravity oil daily through a 9/64-inch choke from 36 perforations at 9366-72 feet. Gas-oil ratio was 334/1 and tubing pressure gauged 1400 pounds under flow. The well was drilled to a total depth of 10,679 feet and plugged back for completion.

Beauregard Parish: Sun Oil Company's Rice Land & Lumber Company 1, 32-4s-11w, wildcat in the Singer Area, continues to make a series of deep production tests below the 11,000-foot zone. The latest test reported was made through 40 perforations at 1,362-72 feet where only a slight blow resulted. These perforations have been squeezed. A previous test which was also squeezed was made through 40 perforations at 11,925-35 feet where the well flowed salt water. Tests made at 11,954-64 feet gave the same results.

Rapides Parish: Union Producing Company et al's Belgard 1, 14-4n-3e, wildcat test in the Big Island area, is drilling below 10,715 feet after taking cores from 10,668-678 feet where 8½ feet of shale with streaks of lime showing no indications were recovered. The well is scheduled for 12,000 feet, and proposes to test the Massive sands in the Tuscaloosa between 9200-9300 feet.

St. Landry Parish: Sun's L. A. Guidry 1, 13-8s-3e, deep test in the North Cankton area, is continuing attempts for a successful completion. Latest reported perforations have been made with 12 shots at 10,221-224 feet and the well was being swabbed for the test. Previous tests conducted through 44 perforations at 10,208-223 feet flowed wash water and gas under 700 pounds pressure.

Plaquemines Parish: Gulf Refining Company's Eugene DeArmas et al 1, 57-20-18e, wildcat in the Grand Bay field area, continues to drill in sandy shale below 12,392 feet. Reports indicate the well correlates about 750 feet low to the field. Water sands were picked up at 8943-9015 feet.

St. Mary's Parish: Humble Oil & Refining Company's Bayou Carlin State 1, deep test at Bayou Carlin, is preparing to perforate for production after setting 5½-inch production string to bottom at 11,614 feet.

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☆ North Louisiana

Caddo Parish Wildcat Still Testing After Small Show

Richland wildcat abandoned; wildcat near Plain Dealing down to 9107 feet; Caddo wildcat with small show still testing; Longwood area test being acidized.

Caddo Parish: Union Producing Company's Noel Estate A-1, 11-19-16, Longwood area wildcat, was preparing to acidize. Union's Fly 1, 19-16-16, Mooringsport area wildcat, was drilling in shale and lime at 5418 feet. Phillips Petroleum Company's Waskom 1, 29-19-16, which had a small show some time ago, was still testing.

Bossier Parish: Barnsdall Oil Company's Crystal 1, 28-21-11w, Benton field, had a fishing job at 8185 feet. G. H. Vaughn's Herrick-Johnson 1, 36-21-13w, was reported testing below 8193 feet. Same operator's Will E. Hall et al 1, 13-20-13w, set 7-inch string at 8242 feet. Barnsdall's Annie O. Hughes, 6-20-12w, was drilling at 8013 feet, and expected to begin coring at 8042 feet. Same operator's Dalrymple Unit 1, in 21-20-12w, was drilling below 5931 feet in Travis Peak.

Claiborne Parish; The Ohio Oil Company's deep test, Bond-Beene 1, 22-23-8w, was drilling at 10,374 feet. A blowout was threatened in testing at 9953-63 feet, where salt water was encountered, but this was sealed off and drilling continued. It is checking formation for deeper gas pay, and is now at the deepest horizon in the Claiborne field. W. O. Woodward Mattie Delaney et al, 20-23-7, was reported swabbing some oil and salt water after perforating from 4476-86. Total depth is 5337 feet.

Sabine Parish: The Carter Oil Company's Louisiana Long Leaf Lumber Company 1, 27-7-10w, was drilling in shale and lime at 4035 feet.

L. & L. Oil Company's Pelican State Bank, 25-10-13, set 7-inch casing at 1646 feet, tested, and after encountering salt water, acidized, and was drilling in chalk at 1800 feet.

Bienville Parish: Placid Oil Company's Nebo A-6, 31-16-6w, was reported completed below 8100 feet as a gasser.

Union Parish: A. B. Edwards Company's Taylor et al 1, 34-22-3e, a wildcat, was completed at 2185 feet for 1,125,000 cubic feet of gas; after acidizing, the flow was 5,069,000 cubic feet.

☆ Arkansas

Haynesville Extension Test Not Likely to Be Producer

Scant hope held that Haynesville extension edge well will be producer; wildcat in Miller County abandoned; gauges show 3 Wesson field wells, completions reported last week, flowing daily 110 to 128 barrels.

Columbia County: McAlester's D. E. Rogers A-1, C SE SW 10-17-19, which made 160 barrels of oil per day from open hole, was 1 of 2 producers in the Village field. Total depth was 7386 feet. Ashland Oil & Refining Company's Bond Unit 1, N half S half SE 10-17-19, Village field, was completed as a gas distillate well, producing 1,063,750 cubic feet of gas and 25 barrels of distillate per day between 7405-10 feet, gas oil-ratio 40,000/1. Skelly Oil Company's Myrtis Pipes Unit 1, 26-19-20, Haynesville extension, is still being delayed because of too much salt water, showing from 50 to 90 percent water. Hopes for a commercial producer for this northeast edge well are considered small. Total depth is 5704 feet. McAlester Fuel Company's wildcat, W. H. Russ 1, SW SW 12-16-20, 3 miles north of east from McNeil, and 1 mile south of Stephens field production, was drilling around 1300 feet.

Ouachita County: Gauges for several completions in the Wesson field were announced as follows: McAlester Fuel Oil Company's N. R. Hog 2, NE SE SW 24-15-19, 110 barrels of oil daily, gravity 33, gas-oil ratio 300/1; same operator's C. M. Wesson A-2, SE NE SW 24-15-19, 128 barrels of oil daily, gravity 33.4, gas-oil ratio 325/1; same operator's C. M. Wesson D-4, SW SE NW 24-15-19, 115 barrels of oil daily, gravity 33.2, gas-oil ratio 300/1. All are flowing through small chokes. N. R. Hog 1 and C. M. Wesson A-2 are from Travis Peak, and C. M. Wesson D-4 from the Glen Rose sand.

Union County: J. E. Berry's Eke Murphy 1, SE SW SW 8-16-15, Old Smackover field, was put on the pump and tanks set up. North of the Eke Murphy well, Johnston and Owen were testing S. T. Tyson 1, NW SE NW 27-15-17, after perforating in the Meakin sand at 2328-34 feet.

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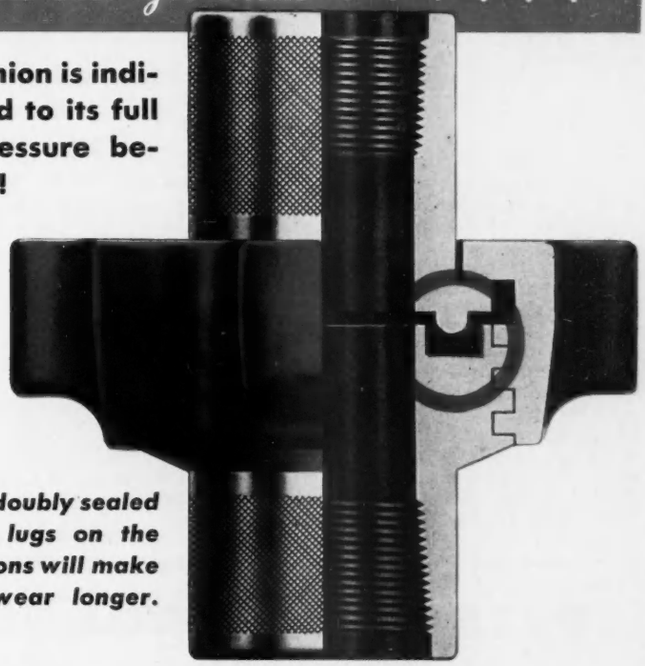

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☆Mississippi

Franklin County Cranfield Outpost Is Likely Producer

Cranfield outpost in Franklin County seems assured producer; 3 more completions noted for Eucutta; 2 Copiah County tests abandoned.

Franklin County: Gulf Refining Company's Ella G. Lees 3, SWc 32-7n-1e, appears certain of commercial production to extend the Cranfield field a short distance across the county line. The well was drilled out to 10,435 feet and perforated at 10,422-28 feet with 36 shots opposite the Massive sand zone. On 18-hour test, 900 feet of oil were recovered with tubing pressure at 110 pounds. The California Company's Homochitto Lumber Company 2, 29-7n-1e, also attempting a field extension of Cranfield, is drilling below 9060 feet with no shows indicated from the Wilcox sand higher up the hole.

Adams County: Phillips Petroleum Company's Davey 1, 46-8n-2w, prospective pool opener, continue to experience trouble in eliminating salt water input. Casing was reperferated at 10,030-045 feet, but a subsequent test made only a small amount of oil. Roeser & Pendleton-Sohio Petroleum Company's Baker-Maier 1, 34-6n-2w, which was successfully completed several weeks ago and then shut down preparatory to reworking in effort to eliminate salt water has resumed tests, but is still making plenty of water. If efforts to cut down salt water input are unsuccessful, the well may be plugged back to the Wilcox zone.

Wayne County: R. L. Fisher's G. M. & O. Ry. 1, SE NE 22-9n-8w, wildcat has been abandoned in the Massive sand at 7003 feet. Cores taken from the Eutaw horizon at 5178-90 feet recovered shows of oil but they were so slight as to have no commercial value. Humble Oil & Refining Company's Masonite B-1, SWc 21-9n-7w, is drilling below 5072 feet in the Eutaw zone with no shows noted. Drill-stem tests of 3 sections of the Wilcox horizon recovered only mud and salt water. In the Eucutta field 1 well was completed and 2 were readying to go on the pump. Humble's G. M. & O. Ry. B-5, NEc 3-9n-9w, pumped 88 barrels of 31.5-gravity oil in its initial production test from perforations opposite the Eutaw zone at 5238-45 feet. Gulf's Mrs. Ereta Langley 2, NEc NW NW 11-9n-9w, and G. S. Stanley 29, NWc SE SE 6-9n-8w, swabbed good amounts of oil from the productive Eutaw horizon and are preparing to install pump.

Madison County: Leonard Jones & Associates' J. R. Anderson 3, SW SW NW 1-8n-1w, Flora field, is pumping oil and salt water as a possible commercial producer. Porous gas rock was entered at 4355 feet and after running tubing well was swabbed down.

Jefferson County: Humble's J. Fred Gordon 1, NEc 25-9n-1w, Fayette field, is swabbing hole in an effort to establish production after reperforating at 9693-98 feet. Formation was acidized with 1000 gallons, but subsequent tests recovered only small shows of oil with considerable salt water.

Copiah County: The Carter Oil Company's Reynolds C-133 1, NWc 12-10n-5e, deep test, was abandoned as a duster in the Comanchean zone at 10,502 feet. The Massive sand, topped at 9979 feet, was extensively cored, but no shows were recovered there or at any other point along the hole. Stanolind Oil & Gas Company's T. A. Huntington 1, wildcat in NW SE 28-1n-1w, was also abandoned at 1650 feet. Cores taken at 1575-80 feet recovered dense lime with slight sulphur odor.

Alabama

Mikton Oil Company's Mike Vergos 1, C SE NW 21-3s-2w, Mobile County wildcat, is drilling below 5623 feet with no shows noted.

Walker County: J. H. Deason's De-Bardelaban 1, SE NW 6-14s-5w, wildcat, has been abandoned as a duster at 1925 feet. Shows of oil were reported in the Tuscumbia zone below 1825 feet, but subsequent tests developed only salt water. Glen D. Rose Oil & Gas Company's First National Bank of Brimingham 2, NW SE 30-12s-7w, is held up by fishing job at a total depth of 1637 feet.

Winston County: Glen D. Rose's First National Bank of Birmingham 3, SWc SE 7-12s-8w, has reached 1070 feet after running casing. Operations are shut down to move in new equipment.

Florida

O. D. Robinson's State Well 1, NEc NW 29-59s-40e, Monroe County deep test which had slight shows of oil in the 10,300-foot zone, remains shut down. Gulf Refining Company's State 1, SWc 2-67s-29e, wildcat, is drilling below 4678 feet after recovering drill stem. No shows have been reported.

Hernando County: The Ohio Oil Company's Hernasco Corp. 1, NWc 19-23s-18e, wildcat is drilling below 5500 feet. Cores taken at the 5400-foot zone recovered hard lime and shale.

Gilchrist County: Sun Oil Company's Alto Adams 1, SWc 15-9s-15e, is running core tests below 3423 feet. No shows have been reported.

Franklin County: The Pure Oil Company's H. C. Lister 1, NWc 17-7s-7w, is waiting on cement after running surface casing.

Collier County: Humble Oil & Refining Company's Gulf Coast Realty Co. 6, SW NE 19-48s-30e, is drilling below 10,867 feet after running electric log to 10,397 feet. Slight shows of oil were recovered from cores taken between 9740-9849 feet and lower section of zone was acidized with 2000 gallons, but a drill-stem test at 9801-59 feet recovered only mud and water.

☆Michigan

Lake County Project Carries Much Water After Acidizing

McCallum and Craft's State 1, NW NE SW 27-17n-12w, Yates Township, Lake County, carried only a show of oil and considerable water following 1000-gallon acid treatment to a Monroe oil saturation zone at 3415 feet. Abandonment is expected.

Oscoda County: The Ohio Oil Company and Sohio Petroleum Company's Mio Unit 1, SE NW SW 30-25n-3e, bottomed at 5129 feet and plugged back to 4255 feet, carried a show of oil and water in the Richfield section, 4170-4250 feet. Casing seat was damaged in an attempt to acidize with 1000 gallons to delay further production tests.

Kent County: James J. McGerry's Williams 1, NE NE SW 36-9n-11w, outpost a mile south of the 3-well Rockford pool, showed 1000 feet of oil in top of Traverse lime at 2207-12 feet.

Mecosta County: Sun Oil Company is rigging up cable tools to deepen Denslow 1, S½ SW NW 1-16n-8w, northwest edge of the Fork field, to test Richfield at 5000 feet for gas and distillate. The company recently placed an offset on production in the Richfield zone, making 15 to 25 barrels of distillate and 500,000 cubic feet of gas daily.

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☆ Illinois Basin

Carter Drilling Important Test North of Mattoon Pool

The Carter Oil Company has an important wildcat test under way at Daily-Hopper 1, NW SW NW 14-13n-7e, Coles County, Illinois, 4 miles north of production in the Mattoon pool and approximately ½ mile southeast of a small producer drilled by the same company more than 3 years ago. The drill is now below 1000 feet.

National Consumers' Arthur 9, at the northwest edge of the Mattoon pool, is waiting on cement after a preliminary test of Devonian lime, showed some oil, water and approximately 1 million cubic feet of gas daily.

Marion County: The Texas Company's Canull 1, SW NE NE 6-1n-1e, flowed 30 barrels per hour after 500 gallons of acid in the Trenton lime topped at 4502 feet. The well, located in the Lake Centralia area, was deepened from the Devonian. Total depth is 4620 feet.

Wayne County: Olson Drilling Company's Lewis 1, E½ NE SE 36-2n-8e, 4 miles west of Mount Erie, is showing for the heaviest producer of the week in Illinois. After acid in the Rosiclare at 3068-78 feet, the well flowed 1108 barrels of oil in 24 hours.

Richland County: The Pure Oil Company's Howard 1, NE NE SE 13-2n-9e, a semi-wildcat test, pumped and flowed 25 barrels of oil per hour after acid treatment in McClosky lime topped at 3174 feet.

Indiana

R. E. Johnston's Barrett 1, SW NE NE 27-5s-14w, Posey County, a mile south of the South New Harmony pool, was completed for 50 barrels of oil in 24 hours from Hardinsburg sand at 2370-80 feet.

☆ Rocky Mountain Area

River Dome Structure Test In Wyoming Holds Promise

Wyoming's River Dome test promising; Cat Creek continues to hold Montana spotlight; Douglas Creek tests may extend Colorado's Rangely field area.

Wyoming

The Pure Oil Company's No. 1 wildcat on the River Dome structure in Washakie County 9 miles north of Worland has water, gas and oil. When the well was about to be abandoned because of water, encountered in the Big Horn lime at 11,379 feet, a heavy gas flow was brought in during a drill-stem test in the Embar at plugged back depth of 9990 to 10,050 feet. With the gas came an estimated flow of 400 barrels per day of greenish-amber colored oil testing 41.8 gravity, indicating an excellent producer.

Montana

While a new Montana "deepest well" record was set by The Carter Oil Company-Phillips Petroleum Company joint test on the Blackfeet Indian reservation in Glacier County at 9705 feet, interest continues to center in Petroleum County on the rapidly-expanding Cat Creek oil field. One of the best producers brought in since the deeper producing horizon was opened up last fall is the new Mitchell 4 of Bill Hanlon and associates, with a flow of more than 800 barrels of oil per day after penetrating the sand only 5 feet. Production in the field has been spotty, with some wells near excellent producers being completed as dry holes. Interesting tests are underway on the West Dome of the Cat Creek anticline.

Colorado

Among the many activities now being launched on the fringes of the Rangely area are scheduled wildcat tests of the Douglas Creek structure, some 12 miles south of Rangely. The Utah side of the Uinta Basin also is coming in for a big play, with virtually every acre between Rangely field and the Vernal leased by major operators, including The Texas Company, The California Company, Carter, Stanolind Oil & Gas Company and Phillips. Rangely field now has 50 producers, flowing from the Weber sandstone, and 37 wells are driling with many others awaiting crews and rigs.

☆ Canada

Home-Brazeau Wildcat Hikes Gas Volume After Acidizing

Home-Brazeau Syndicate 1, lsd 5 17-43-17w5, testing a sliver of Madison limestone on the east edge of what is regarded as a large Central Alberta Foot hills Anticline, gave good news when the 15 feet of slight porosity in the section opened up with acid. (See pages 24-28, Monthly International Section).

The lime sliver (between base of the 7-inch casing at 9523 feet and the fault at 9597 feet) showed 800 mcf of gas plus a show of light, green oil prior to acid. A thousand gallons of acid boosted gas volume to 2500 mcf. A further 3000 gallons of acid hoisted flow to 10,500 mcf, flowing against 310 pounds on the 3-inch tubing and 660 pounds on the casing. Closed in before the second acid shot, tubing and casing pressure built up to 3300 pounds per square inch in 16 hours, indicating a formation pressure of around 4300 pounds.

Eastward extension of the Conrad Ellis sand field on the South Alberta Plains is indicated by Standard Oil Company of California's Conrad-Province 57-33B, SE 10 acres lsd 14 33-5-15w4. A quarter of a miles east of the current east producing boundary of the field, the well gave an 1150-foot rise of water-free 26-gravity oil in an hour drill-stem test through 4½-inch pipe, after halting at 3026 feet, a few feet in the Ellis sand. A string of 8¾-inch casing has been set to 3014 feet, and well will be placed on pump shortly.

Consumers' Co-operative Refineries of Regina, Saskatchewan, has reached the Madison Limestone objective in its initial Alberta wildcat. The Co-op 1, lsd 11 22-17-2w5 has reached the lime at 10,736 feet, 6676 feet subsea, and has set 7-inch casing at 10,748 feet. The wildcat is at Stimson Creek, about 4 miles southeast of the south limit of the Turner Valley oil field, Southern Foothills.

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EXPLORATORY COMPLETIONS

ALABAMA WILDCAT

Walker County—Failure: J. H. Deason's Debardelahan 1, se nw 6-14s-5w, abnd 1925.

ARKANSAS WILDCAT

Miller County—Failure: Texas Co.'s C. W. Persons 1, c nw se 29-16s-25w, Tokio 2678, Paluxy 3185, Nacatoch 1610, abnd 4203.

CALIFORNIA WILDCATS

Kern County—Failures: Royalty Service Corp.'s 34-M-1, 34-26s-27e, Dyer Creek area, Vedder 3231 ft, abnd gray sd, 3762.

U. S. Drilling's Bohen 1, 27-26s-28e, Mount Poso area, abnd 1726.

Wilshire Oil's Lehman 2, 18-28s-20e, Belridge area, Devil Water Silt 580 ft, abnd gray sd 987.

Los Angeles County—Failure: Del Sur Oil Co.'s Del Sur 1, 26-7n-13w, Palmdale area, abnd 3025.

Orange County—Failure: F. E. Mosier's Newland 1, 12-6s-11w, Huntington Beach area, abnd gray sd 3154.

ILLINOIS WILDCATS

Clay County—Failure: Magnolia's Frost 1, sw nw sw 4-3n-6e, abnd 3104.

Clinton County—Failure: B. F. Thompson's Roper 1, se se sw 4-1n-1w, abnd 1468.

Cumberland County—Failure: F. R. Stocker's Cooper 1, ne ne nw 34-10n-7e, abnd 2447.

Hamilton County—Failure: Nat'l Assoc. Pet's Neel 1, nw ne se 32-5s-7e, abnd 3113.

Moultrie County—Failure: Fryer-Simpson Drlg Co.'s Waggner 1, nw nw sw 23-12n-6e, abnd 2185.

Wayne County—Oil Discovery: J. J. Lynn's Dye 1, n2 nw nw 2-1s-7e, pumped 256 bbls day, McCl 3148-59 ft, td 3166.

INDIANA WILDCATS

Newton County—Failure: A. E. Tonn's Arnold 1, nw ne ne 4-31n-8w, abnd 922.

Owen County—Failure: Duncan & Long's Miller 2, sw nw sw 18-9n-5w, abnd 1600.

KANSAS WILDCATS

Butler County—Oil Discovery: Nadel & Gussman's Crowley 1, sw sw se 11-28s-5e, pump 100 bbls day, Bartlesville sand 2700-36 ft, td 2738.

Butler County—Failure: O. J. Connell et al's Eckel 1, se se ne 1-26s-5e, KC 2078 ft, abnd 2750.

Ness County—Failure: Jones & Shelburne et al's Evel 1, sw sw nw 7-16s-25w, abnd 4523.

Rooks County—Failure: Goodpasture & Vernon Oil & Gas Casey 1, sw sw se 16-9s-19w, Arb 3549 ft, abnd 3583.

Stafford County—Failure: Donovan Engineering's Eads 1, nw ne ne 10-25s-15e, Arb 1817 ft, abnd 1920.

KENTUCKY WILDCATS

Crittendent County—Failure: Pfunder et al's Travis 1, ne nw ne 24-K-19, abnd 1086.

Henderson County—Discovery: Basin Drlg Co.'s Washburn 1, se se ne 6-P-23, pump 200 bbls, McCl 2548-52 ft, td 2703.

Henderson County—Failure: O. Blankenburg et al's Vogel 1, ne nw se 12-P-23, abnd 2555.

McLean County—Failure: Miller & Shiarella et al's Ohio Valley 1, ne nw ne 9-M-27, abnd 1725.

Union County—Failure: South Penn's Stevenson 1, sw sw nw 14-N-18, abnd 3388.

NORTH LOUISIANA WILDCATS

Bossier Parish—Failure: Pyle & Lensgrapt's W. L. Pirkle 1, 31-19n-12w, (OWDD), chalk 1390-1790, otd 1864, abnd 3009.

Concordia Parish—Failure: S. W. Richardson's Madison Oil & Dev. Co. A-1, 34-6n-9e, Wilcox 4224, Midway 7480, Cret 8590, Tuscaloosa 9186, Marine Tuscaloosa 10,003, L. Cret. 10,502, abnd 10,601.

Madison Parish—Failure: S. W. Richardson's Frederick Hooten 1, 31-18n-12e, no Tuscaloosa, Massive 3870-4126, abnd 4660.

Richland Parish—Failure: H. G. Lewis-Austin E. Stewart's Robt. B. Rhymes 1, c nw se 8-15n-5e, gas rock 2540, abnd 4223.

SOUTH LOUISIANA WILDCATS

Assumption Parish — Failure: Union of Calif.'s Norman-Breaux Lbr. Co. 1, Grassy Lake prospect, abnd 12,012.

Beauregard Parish—Failure: Magnolia's Lutcher-Moore Lbr. Co. 2-D, fr sec sect 6 go n 1980 th w 660 to lcn in 6-6s-11w, abnd 8404.

Calcasieu Parish—Failure: Max Pray's Elix. Yust 2, 330 s 660 w of nec 28-10s-12w, abnd 10,066.

Jefferson Parish—Oil Discovery: Calif. Co.'s E. P. Brady et al 1, 66-16s,24, pay 9363, 36 shots 9366-72 flow 300 bbls 38.7-gr oil, 0.1% wtr, 9/64-in, gor 343/1, td 10,679.

St. Bernard Parish—Failure: Texas' State-Chandeleur Sound St. Lse 335, 19,177 fr USCGS Monument "Lur" in Chandeleur Sound, abnd 9890.

SOUTH LOUISIANA NEW PAY TESTS

Iberia Parish—Oil Discovery: Humble's Mayo Romero 2, 49-12s-7e, pay 9660, 36 shots 9660-65, flow 64.80 bbls 34-gr, 7/64-in, gor 9739/1, tp 2880 lbs, td 9844.

St. Mary Parish—Oil Discovery: Sun's Belle Isle Corp. 9-A, 2-18s-10e, pay 8109, 100 shots 8109-33, flow 62 bbls 34.5-gr, ⅛-n, gor 413/1, tp 250 lbs, td 10,405.

MICHIGAN WILDCATS

Allegan County—Failure: J. F. Reed's Haven 1, nw nw nw 34-1n-14w, abnd 1301.

Gratiot County—Failure: C. W. Teater's Paprstein 1, nw ne se 31-9n-1w, abnd 3300.

Kent County—Failure: C. E. Grimes' Lemunyon 1, ne ne ne 8-9n-11w, abnd 2820.

Lake County—Failure: McCallum & Craft's State 1, nw ne sw 27-17n-12w, abnd 3515.

MISSISSIPPI WILDCATS

Copiah County—Failures: Stanolind's T. A. Huntington 1, nw se 28-1n-1w, Cap rock 1460 ft, abnd 1650.

Carter's Reynold's C-133 1, nwc 12-10n-5e, Wilcox 54 ft, Eutaw 909, Tuscaloosa 9060, Massive sd 9979, Comanchean 10,104, abnd 10,502.

Jefferson County—Failure: William Helis' Dockery-Carpenter 1, swc 12-10n-2e, B. Eutaw 8908 ft, Tuscaloosa 8984, Massive sd 9817, abnd 9903.

Wayne County—Failure: R. L. Fisher's G.M.&O.Ry 1, se ne 22-9n-8w, Wilcox 1320 ft, Eutaw 5175, Tuscaloosa 5707, Massive sd 6772. abnd 7003.

MONTANA

Toole County—Failure: Coolidge & Coolidge's Black Gold Syndicate 1, se nw 30-36n-2e, Berthelote area, TD 2673, slight show gas, dead oil and water at top of Madison lime 2668 ft, abnd.

NEW MEXICO WILDCAT

Lea County—Failure: Culbertson & Irwin, Inc's State 1-D, 3262 ft snl and 660 ft ewl 4-21s-34e, elev 3711 ft, anhydrite 1827, salt 2005-3579, brown lime 3610, Yates 3761, abnd 4005.

OKLAHOMA WILDCATS

Carter County—Failure: Continental's Bonner 1, se se sw 18-3s-2w, abnd 3906.

Choctaw County—Failure: R. O. Haubelt's Schuessler 1, sw se ne 14-6s-14e, abnd 2360.

Comanche County—Failure: J. L. Cowley's Bertram 1, nw se ne 27-1n-10w, abnd 1650.

Garvin County—Oil Discovery: Vickers Petr Co.'s Gibson 1, se ne 30-3n-2w, flowed 270 bbls day, Pennsylvania sand 6520-78 ft, td 7760.

Jefferson County—Failure: Bridwell Oil & Gas Co.'s Seay 1, nw ne se 16-6s-6w, abnd 2598.

Love County—Failure: W. F. Turner's Fee 1, se se se 21-7s-1w, abnd 5811.

WEST TEXAS WILDCATS

Ector County—Failure: Texas' Connell 29, 659 ft snl and 1989 ft ewl PSL 9, blk B-16, 1½ mi w of Penwell field, elev 2877 ft, anhydrite 910, Yates 2150, San Andres 3470, Glorietta (Holt) 4400, Permian-Devonian contact 7048, Silurian 7830, Fusselman 8095, Montoya 8220, Simpson 8440, McKee 8885, Ellenburger 9525, abnd 9675.

Midland County—Failure: Magnolia's Parks 1, 1980 ft ewl and 660 ft snl sec 10, M. Daugherty sur, elev 2840 ft, anhydrite 1710, Yates 2810, brown lime 4520, San Andres 4695, abnd 5914.

WEST CENTRAL TEXAS WILDCATS

Coleman County—Oil Discovery: Fulwiler-Hughes-Allied Oil's Templeton 1, 450 ft snl and 330 ewl HT&B Ry. 8, blk 1, elev 1954 ft, Capps lime 3140, flowed 1135 bbls 45-gr, gas-oil ratio 824/1, natural via 30/64-in choke from Gray sand (Strawn) open hole 3457-87 ft.

Jones County—Failure: Alder Oil Co.'s Steele 1, 330 ft wel and 990 ft nsl nw¼ T&NO Ry. 6, blk 2, elev 1743 ft, abnd 2648.

Shackelford County—Oil Discovery: Allied Oil Co.'s Sanders 1, 467 ft out e corner TE&L Co. sec 583, elev 1355, Palo Pinto 2140, Bend 3870, Mississippi 4424, Ellenburger 4511, flowed 543 bbls 42.6-gr and 24 bbls water, gas-oil ratio 500/1, via 2-in, acidized Ellenburger open hole with 500 gals at 4535-40.

NORTH TEXAS WILDCAT

Archer County—Failures: D. H. Bolin et al's Purcell 1-B, 1000 ft snl and 1320 ft wel blk 102, Jefferson CSL, abnd 1215.

Bridwell Oil Co.'s DeBus 1, 600 ft ewl and

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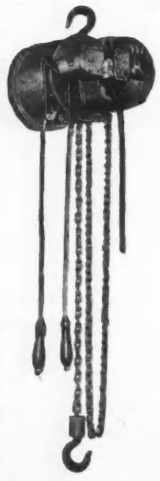

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DANVILLE, ILLINOIS

2050 ft snl S.P.Ry. 2, A-1202, abnd 2010.

Clay County—Failure: Panhandle Ref. Co.'s Segler 1, 330 ft out sec lot 16, W. A. Farris sur A-146, elev 1079 ft, Bend 5707, Ellenburger 6445, abnd 6509.

Cooke County—Failure: R. B. Hollandsworth's Tischler 1, 3150 ft snl and 2836 ft wel Nathan Barnett sur A-124, abnd 1268.

Jack County—Failures: J. M. Hickey et al's King 2, TE&L Co.'s sec 3307, abnd 310.

Hanlon & Buchanan's Crowley 1-E, 1087 ft snl 233 ft wel S.P. Ry. 1, A-579, abnd 620.

Wichita County—Failures: Akin-Dimock's McDonald 1, 1800 ft nsl and 150 ft ewl blk 305, Waggoner Colony Lands, abnd 2352.

F. L. Harvey et al's West 1, 150 ft nsl and 200 ft ewl of e 80 of n 160 of 320-ac tr, S.P. Ry. A-265, abnd 1803.

Wilbarger County—Failure: Paradis Oil's Waggoner Est. 1-H, 1500 ft snl and 330 ft ewl H&TC Ry. 5, blk 17, abnd 4575.

EAST TEXAS WILDCATS

Anderson County—Failure: L. E. Damon et al's Davey & Royall 1, 2250 ft s of middle n line of sur and 990 ft ne of m/w/ sw line of John Squires sur, elev 556 ft, abnd 450.

Navarro County—Failure: Tex Harvey's Jackson 1, 350 ft snl and 755 ft from e and w lines of 101.2-ac tr, or 350 ft from nw and 3125 ft from ne lines of John McNeal sur, Austin 2120-2570 ft. Woodbine 2860, Georgetown 3060, abnd 3093.

Rains County—Failure: M. N. Massad et al's Whittle 1, 330 ft out NWc of 81-ac tract and Levi Welch sur, elev 515 ft, Pecan 1720, Gober 2400-2500, Austin chalk 2910-3270, Woodbine 3873, abnd 3934.

Rusk County—Failure: L. O. McMillan et al's Irwin-Standard 1, 467 ft from m/w/n and w lines of 168-ac tract, Geo. May sur, Pecan chalk 2945-3282 ft, Austin 3745-3914, Woodbine 3914, Buda 4030, abnd 4062.

EAST TEXAS NEW PAY DISCOVERY

Henderson County—Opelika Field New Pay Discovery: Lone Star Producing Co. et al's Ira Buckalew 1, 67 5ft snl and 920 ft from e and w lines of 52.7-ac lse, or 2050 ft from m/s/n and 4300 ft from m/w/w lines of (north) Adrian Anglin sur, nw side of gas-distillate multi-pay area, elev 454 ft, dual completion, Georgetown 5506 ft, Paluxy 6700, Glen Rose 7060, Massive anhydrite 8392-8643, Rodessa porosity 8645, Pettit 9350, flowed 330 bbls 41.9-gr with gas-oil ratio 1228/1 natural via ¼-in from Rodessa perf 8827-53 ft, and 35 million cu ft with 12 to 15 bbls of condensate per million, after 8000 gals acid thru Pettit perf 9351-89 ft, td 9500, pb to 9463.

UPPER TEXAS COAST WILDCATS

Chambers County—S. Mayes Oil Discovery: Humble's Lula Wallis et al 1, 6500 se prod on 200-ac tr, S. Mather sur, blk 13, tr 1, pay 9194, 24 shots 9194-98, flow 185.45 bbls 36.6-gr, 0.2% wtr, 3/61-in, gor 10,530/1, td 10,010.

Harris County—Failure: William Helis' Foster Lbr. Co. 1, 3300 fr sl 1800-ac tr, 5800 w San Jacinto River, abnd 8661.

Jefferson County—Failure: McCarthy O&G Corp.'s Geo. Gill Est. et al 1, 6000 s Fannett prod, 320-ac tr, T&NO sur, sec 141, abnd 9265.

San Jacinto County—Distillate Discovery: Fred M. Manning's Central Coke & Coal Co. 1, c 40-ac unit of 1533.4-ac lse, J. Ferguson sur 2½ mi sw Meroy fld, Wilcox 8295, pay 8310, 344 shots 8310-45, flow 14.19 bbls 50.2-gr, 285,000 gas, 13/64-in, gor 19,370/1, td 11,001, pb 8351.

UPPER TEXAS COAST NEW PAY TEST

Liberty County—Oil Discovery: F. J. Bashara's H. L. McGuire 2, 455 fr nl 261 fr el 10.44-ac tr, M. G. White sur, pay 3796, 198 shots 3299-3309, flow 198 bbls 22.4-gr oil, 1.4% wtr, 1/8-in, tp 280 lbs, td 3796.

SOUTH CENTRAL TEXAS WILDCATS

Bastrop County—Failure: C. W. Voyles' W. E. Rosanky 1, 530 fr nl 330 fr wl 1035-ac tr, Musgrove Evans sur, abnd 2814.

Caldwell County—Failure: Clyde Lane's A. W. Jolley 1, 330 fr ne&nwl 86-ac tr, 2260 fr nwl 330 fr sel J. B. Gray sur, abnd 1378.

Edwards County—Failure: Meco Prod Co. et al's J. W. Holman 1, 1815 fr el 330 fr sl CCSD&RGNG sur 25, abnd 1053.

Kinney County—Failure: Eltex, Ltd's Biedler Est. 1, 20,000-ac lse, Dolores Soto de Beales Gr, D. G. Gay sur, abnd 5137.

Milam County—Failure: Andre & Foster's E. Dornhoefer 1, 1500 fr nly/nwl 800 fr swl 386-ac lse, S. C. Tobertson sur, abnd 710.

Milam County—Oil Discovery: R. L. Holcomb et al's J. L. Byrd 2, 1350 fr nwl 1551 fr swl 189.1-ac lse, J. J. Acosta Gr, pay 1210 Austin Chalk, no perf, pump 55 bbls 34-gr oil, td 1384.

LOWER TEXAS COAST WILDCATS

Jim Wells County—Failure: Shell's Wm. Van Hoogenhuyze 1, 660 fr n&el lot 6, Kleberg County line, lot 6, blk 10 Burton & Danforth sbdn Parrita Rch, 232.65-ac lse, abnd 10,086.

Live Oak County—Failures: Sid Katz-Texon Oil Co.'s Bronson 2, 800 fr nel 1000 fr nwl J. Jacobs sur 2, 528-ac lse, abnd 1412.

..Producers Corp. of Nevada's B. V. Matheson 1, 467 fr nw&nwl 106.7-ac lse, W. Freeman sur 272, ne Mt. Lucas fld, abnd 4476.

WILDCAT STARTS

CALIFORNIA

Kern County: Bender Oil Operations' Kelly 1, 20-28s-27e, Kern Front area, lcn.

G. B. Finch Oil Co., Ltd., Tejon 6, 36-12n-19w, Grapevine-Tejon area, lcn.

General Pet's B.M.Q. 1, 20-11n-23w, Santiago-Midway-Sunset area, fdn.

J. Paul Getty's Derby 11, 33-30s-29e, Mountain View area, lcn.

L. S. Gilmour's Corey 84, 13-30s-28e, Mountain View area, lcn.

Independent Exploration's Temblor 3, 17-29s-21e, Sheep Springs area, grade.

Pacific Gulf Oil's Karpe 1, 30-28s-29e, Round Mountain area, lcn.

Gene Reid Drilling's Anderson 26, 18-29s-21e, Temblor area, lcn.

Wilshire Oil Co.'s Lehman 3, 18-28s-20e, Belridge area, drlg.

Kings County: Pacific Central's Finch 3, 36-23s-22e, Trico area, drlg.

Los Angeles County: Richfield's Edison 1, 16-2s-12w, East Los Angeles area, lcn.

Superior Oil's and British-American's Black 2, 13-4n-18w, Del Valle area, lcn.

ILLINOIS

Christian County: M. H. Richardson's Gregory 1, se se sw 11-15n-2w, lcn.

Coles County: Harry M. Miller's Berkley 1, se sw se 12-11n-10e, drlg.

Earnest Zinch's Woodward 1, nw sw sw 18-11n-10e, drlg.

Cumberland County: Nation Oil Co.'s Decker, se se se 6-10n-10e, drlg.

Gallatin County: R. B. Martin's Pioneer Trust 1, nw ne se 2-8s-8e, drlg.

Shelby County: N. V. Duncan's Shuemaker 1, ne ne nw 12-10n-6e, lcn.

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KANSAS

Butler County: E. H. Adair's Clark 1, nw ne se 32-25s-4e, lcn.

Deep Rock's Hodge 1, se se nw 7-27s-4e, rur.

Clark & Ives' Phillips 1, se se nw 16-29s-7e, drlg.

Kingman County: Deep Rock's Whitmer 1, nw nw se 10-30s-9w, drlg.

McPherson County: Galva Oil, Gas & Industrial's Barth 2, sw sw sw 29-19s-2w, lcn.

Phillips County: Helmerich & Payne's Baird 1, ne ne ne 8-4s-19w, drlg.

Rush County: Darby & Bothwell's Wagner 1, ne ne nw 28-18s-16w, lcn.

NORTH LOUISIANA

Caddo Parish: Hugh M. Sneed's Simmons 1, 15-16n-14w, 3000-ft test.

Franklin Parish: R. J. Caraway-F. L. Bryant's Mrs. M. L. Ruple 1, 9-16n-8e, dr 1780 on Paluxy test.

SOUTH LOUISIANA

Point Coupee Parish: Humble's W. R. Bluffington 1, 1020.9 wly alg sl fr sec sect 84 th 726 nly at ra to lcn in 84-1s-7e, 12,000-ft test.

MICHIGAN

Allegan County: Chester Anderson's Middlemans 1, nw sw se 35-3n-14w, lcn.

Isabella County: Gordon Oil Co.'s Foley 1, se sw nw 29-15n-4w, rig.

Kalamazoo County: F. D. Gannett's Meyers 1, ne ne ne 31-1s-12w, dr.

Van Buren County: Ford Oil Co.'s Tollas 1, sw se ne 10-1s-16w, lcn.

OKLAHOMA

Creek County: C. E. Beal's Briggs 1, nw sw sw 27-19n-8e, drlg.

Cotton County: C. W. Smith et al's McAlister 1, sw sw nw 22-2s-10w, drlg.

Grant County: C. L. Carlock's Dixon 1, sw sw ne 16-25n-3w, rur.

Okfuskee County: Zephyr Drlg Co.'s Spanlard 1, se sw se 29-12n-8e, rur.

Pawnee County: J. A. Turner's Summers 1, sw sw sw 31-21n-5e, lcn.

Stephens County: Lundy & Shears' Wild 1, ne ne se 29-1s-5w, lcn.

WEST TEXAS

El Paso County: J. S. Meriwether et al's Brown Realty Co. 1, 1480 ft nsl and 4800 ft ewl sec 35, Maria Rodriquez sur, nw corner of county, lcn 1500-ft cable test.

Lamb County: Humble's G. A. Branton 1, c sw se sec 18, blk 1, E. M. Thomson sur, 3½ mi w of Anton field, lcn.

WEST CENTRAL TEXAS

Jones County: Fain-McGaha et al's D. L. Wright 1, sw ne sw T&P Ry. 38, blk 15, lcn 2300-ft cable test.

Humble's O. L. Bishop 1-B, 467 ft out nec nw T&P Ry. 22, blk 19, lcn 6500-ft Ellenburger test.

Parker County: Bradley Kimbrough et al's Ella Gilbert 1, 750 ft snl and 150 ft ewl of 511-ac lease and GWT&P Ry. Co. sur A-1958, lcn 1550-ft cable test.

Taylor County: Homer W. Snowden O&G Co., Ltd's J. D. Jones 1, c nw sw S.P. Ry. 4, blk 9, lcn 3250-ft rotary test.

NORTH TEXAS

Archer County: Cochran & Cain's V. Seay 1, 750 ft out nwc blk 69, Harris subdiv, lcn 1400-ft rotary test.

Peterson-Demontel & Hutcheson's A. L. Harris 2, 1400 ft nsl and 150 ft wel blk 60, Harris subdiv, lcn 1400-ft rotary test.

Cooke County: J. W. Modesett et al's A. J. Dennis 1, 2250 ft wel and 150 ft nsl H. Henderson sur A-444, lcn 2000-ft rotary test.

Haskell County: J. D. Hancock et al's J. R. Coody 1, 3280 ft snl and 1980 ft wel J. G. Pitts sur A-339, 5½ mi se Lawson pool, lcn 3500-ft test.

Montague County: Dave Bennett and J. W. Sorrells' C. W. Milton 1, 330 ft from sw and 580 ft from se lines sec 13, Titus CSL sur, A-730, lcn 7300-ft Ellenburger test.

EAST TEXAS

Kaufman County: O. W. Killam et al's J. W. Nalls 1, 330 ft from sw and 700 ft from se lines of 50-acre tract, J. E. Roof sur, lcn.

SOUTH CENTRAL TEXAS

Bastrop County: A. J. Stormfeltz's Fitzwilliam Est. 1, 660 fr ely/wl 800 fr sly/sl 400-ac tr, J. M. Bangs sur, 2250 Serpintine test.

Bexar County: B. N. Noake's Mrs. Minnie A. Stichaem 1, 330 fr ne&sel lot 3, blk 75, San Antonio Irr Farm Tr, Wm. Miller sur 180, 5000-ft test to Trinity zone.

Milam County: Burt & MacDowell's Otto Galbreth 1, 330 swly alg el fr nely cor J. Schrader tr, 330 e at ra to lcn in 200-ac tr, J. J. Liendo sur, de 879.

Uvalde County: J. A. Green's Kennedy-Nunley 1, 3000 fr el 830 fr sl Jesus Flores sur 1063, 8042-ac lse, 3500-ft test.

SOUTHWEST TEXAS

Duval County: Humble's Dallas Jt. Stk. Ld. Bnk. 1, 990 fr nel 650 fr sel SK&K sur 503 11,746-ac lse, 4000-ft test.

Jim Hogg County: Sun's Weil Bros. 18, 5000 fr el 29,500 fr sl Santo Domingo de Abajo Gr, dk.

Webb County: J. E. Teddlie's O. W. Killam 1, 330 fr s&el blk 12 1650 fr sl 330 fr el sur 1569 on 1192-ac lse, 3000-ft test.

LOWER TEXAS COAST

Bee County: Houston Oil Co.'s Mrs. M. M. McKinney 1, 5267 se alg nel fr n cor L. C. Randolph sur, 1980 sw at ra to lcn on 2705.3-ac lse, Pettus area, mi 8500-ft test.

UPPER TEXAS COAST

Chambers County: Windsor Oil's R. L. White 1, 505 fr wl 1787 fr nl 420-ac lse, T&NO usr, 1½ mi n Fig Ridge fld, 8700-ft test.

Hardin County: L. M. Josey et al's Caswell Tr. Co. 2, 3000 fr Saratoga E flk prod, 148-ac tr, BBB&C sur, 6500-ft test.

Jefferson County: L. D. Cartwright's _____, lot 5 blk 1, Pt. Arthur Land Co. sur, Nederland twnsite, 7.5-ac lse, 2000-ft test.

Montgomery County: F. A. Callery's Thompson Bros. Lbr. Co. 1, 660 fr n&el R. O. Lusk sur and 80-ac lse, 4 mi n Magnolia fld, 10,500-ft test.

Tyler County: Atlantic's J. R. Dempsey 1, 467 fr wl 660 fr sl 22.51-ac lse, L. A. Beard sur, 2100 w sw Houston American's disc well 1, S. Hyatt area, 11,500-ft test.

Texas Fields Named

Two recent field discoveries in the Upper Texas Gulf Coast have been named, according to A. J. Baurenschmidt, chairman of the Nomenclature Committee of the Houston Geological Society. South Mayes is the name given the field discovered by Humble Oil & Refining Company's Lula Wallis 1, S. Mather Survey 13, Abstract 192, Chambers County. The name McCoy has been given the field discovered by The Ohio Oil Company's Kirby Lumber Company 1, J. McCoy Survey, Abstract 310, Liberty County.

Because they have built into them the vital, extra capacity for smooth, dependable, trouble-free operation under the severest stresses and strains to be encountered in the world's most powerful machinery, AMERICAN SUPER HEAVY-DUTY ROLLER BEARINGS have been first choice for over 25 years with most manufacturers of heavy industrial and oil country equipment. Brutally strong, simply constructed, precise—AMERICANS give continuous, 24-hour-a-day service for maximum periods with minimum maintenance, often outlasting the equipment itself. Once adopted, no manufacturer has ever had to switch from AMERICANS.

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Heavy-Duty **ROLLER BEARINGS**

SQUEAKS from the BULL WHEEL

Small Evidence

"Mister, Lawyuh, suh, I craves to sue dat Rastus Jones. He promised to marry me and den he 'loped wid another gal."

"He did, eh? Well, have you anything in black and white to show for it?"

"Nossuh. Jes' all black, suh."

Coos or Cackles?

"I was told to stop in here and buy either a camisole or a casserole, but for the life of me I can't remember which."

"Well, sir, if you'll tell me what kind of a chicken you propose to put in it, perhaps I can help you."

Big Gyp

"It costs me $5000 a year to live."

"Don't pay it. It's not worth it."

Poet's Nook

There ain't no justice in this here lan';
Just got a divorce f'm my ol' man.
An I laughed like heck at th' judge's decision,
'Cause he give *him* the kids an' they ain't his'n.

Encore

Girls who keep on slappin' faces.
Don't see no sights and go no places.

Traveling Man

Returning to his hotel room for the night, the weary traveler had just got into bed when there came a knock at the door. When he opened it he saw a stranger swaying in the doorway. "Shorry—hic—wrong room."

Ten minutes later the knock was repeated and the same drunk peered in. "Shorry—hic—wrong room."

Ten minutes later the knock was repeated and the drunk opened the door and stood there gaping. "My goodnesh! Have you got every room in the place?"

Slight Error

"Now is there any man in the audience who would let his wife be slandered and say nothing? If so, please stand up."

A meek little man rose to his feet.

"Do you mean," roared the speaker, "that you would let your wife be slandered and do nothing about it?"

"Oh, pardon me—I thought you said slaughtered."

Private Battle

"Where'd you get the black eye?"

"In the war."

"Atlantic war or Pacific war?"

"Boudoir."

Life Is Like That

"How do you like married life?"

"Oh, it's great fun. My wife cooks something and I try to guess what it is."

Interior Decorations

A lady at a style show was attracted by an evening gown worn by a curvaceous model. "That would look nice at our party next Saturday," she hinted to her husband.

"Sure would. Why not invite her?"

Double Favor

"Got change for a dime?"

"Here you are, sir, and I hope you enjoy the sermon."

Like Olives

"Do you think you could learn to love me?"

"Maybe, but if I were a man, I'd hate to think I was an acquired taste."

Oversized Chaser

"It can't be done."

"What?"

"See that sign? It says, 'Drink Canada Dry.'"

Virtue's Reward

A motorist had just crashed into a telegraph pole. Wire, pole and everything came down around his ears. They found him unconscious in the wreckage, but as they were untangling him he reached out feebly, fingered the wires, and murmured:

"Thank heaven, I lived clean; they've given me a harp."

Natural Error

"Gee, I made a terrible blunder at dinner last night."

"What happened?"

"Mother asked me if I wouldn't have some corn, and I passed my glass."

Live and Learn

"Say, Sarge, you've been up here in Alaska a long time. What's this Kee bird I've been hearing so much about?"

"Why, that's the bird that sits on the North Pole and keeps crying, "Keeristmus, it's cold."

Definition

Legs are appendages that are extremely necessary to baseball players and girls who are trying to get to first base.

ECOLITE-92BM

With Locking Device and Seals

TWICE APPROVED For DOUBLE SAFETY

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—for use in atmospheres containing Methane or natural gas, gasoline or petroleum vapors. This double-safety lantern has a tamper-proof reflector and cover with locking device and seals. Throws 1500 ft. beam. Instantly ejects broken bulbs from battery circuit. Large handle—360° pivoting feature gives direct illumination where needed and leaves both hands free for work.

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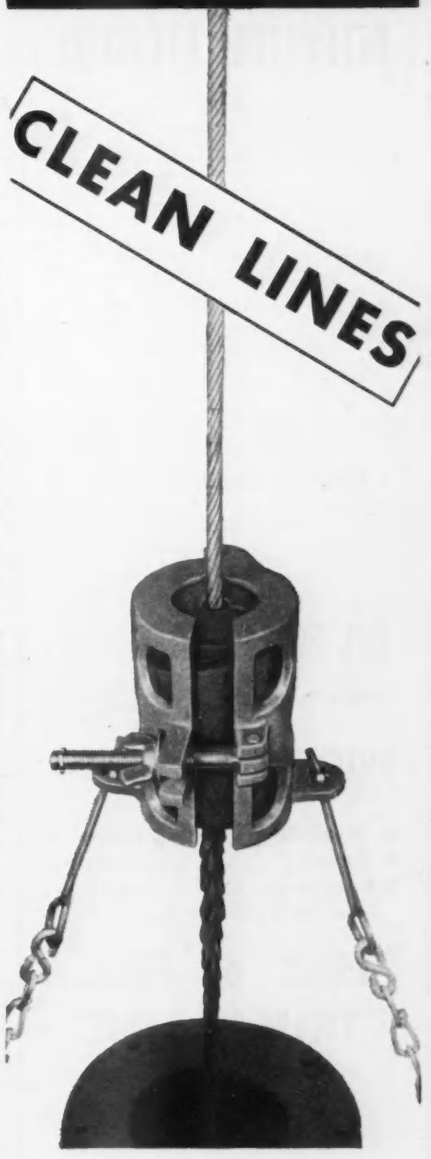
CLEAN LINES



A clean wire line helps your crew. They can work safer and better on a clean floor, free from drippings. With a Patterson-Ballagh Wire Line Wiper the line is stripped completely of mud and oil. A compact steel housing contains a spiral rubber which is inexpensive and easily replaced. The rubber wipes the line as it comes out of the hole. Spark-proof. Use one on every well. Now made of PBX, Patterson-Ballagh's new synthetic rubber.

See Composite Catalog

Patterson-Ballagh WIRE LINE WIPERS

Los Angeles 1 Houston 10 New York 6

New 1945-1946

PETROLEUM REGISTER

The PETROLEUM REGISTER, national and international oil directory, recently issued its 24th Annual Edition, a complete revised record of all branches of the industry with detailed data on Producers, Drilling Contractors, Refiners, Pipe Lines, Marketers and Jobbers, Natural Gasoline Mfrs., etc.

Recent advertisements of the MID-WEST OIL REGISTER in oil journals has caused confusion among many in the industry, who, noting the similarity in names, believe it to be connected in some way with the PETROLEUM REGISTER.

THERE IS ABSOLUTELY NO CONNECTION WHATSOEVER BETWEEN THE TWO PUBLICATIONS.

The PETROLEUM REGISTER, pioneer directory of the oil and gas industry, was established in 1918. It sells for only $10.00 a copy postpaid.

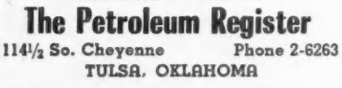
Southwestern Bureau

The Petroleum Register

114½ So. Cheyenne **Phone 2-6263**

TULSA, OKLAHOMA

OIL-FIELD HAULING



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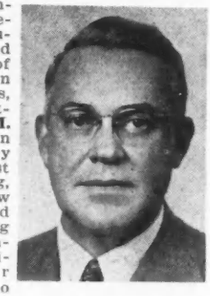
HOUSTON, TEXAS

MEN IN THE INDUSTRY NEWS

DON R. KNOWLTON, who is resigning April 1 from Phillips Petroleum Company as manager of the Foreign Department and as executive vice president and member of the board of directors of the foreign subsidiaries of Phillips, is to enter into a partnership with **FRANK M. PORTER** of the Fain Porter Drilling Company with offices in the First National Bank Building, Oklahoma City. The new firm is to be engaged in drilling contracting and will establish a consulting petroleum engineering service after making a survey to determine the needs of the petroleum industry in the various phases of petroleum engineering.



Don R. Knowlton

* * *

HARRY M. SMITH, scout for Magnolia Petroleum Company in West Texas prior to service in the Air Corps as a captain in the ETO theater, has been reassigned to scouting in Florida, Georgia and the Carolinas with headquarters at Tallahassee, Florida.

* * *

TOM JOE DWYER, civil engineer for Gulf Oil Corporation, has been transferred from Odessa to the Forth Worth division office as assistant chief civil engineer.

* * *

ROBERT H. HARLESS, scout for Magnolia Petroleum Company, has resumed duty in the Oklahoma City district after serving as a major in the Army.

* * *

M. CLAY CHILES of Houston and **H. E. CHILES, JR.,** of Seagraves, Texas, have organized the Chiles Well Servicing Company.

* * *

MILTON R. UNDERWOOD and **JAMIE D. DUPREE,** both of Houston, have incorporated the Underwood Mineral Company.

* * *

MAC L. COKER, World War II veteran and consulting geologist, has announced his candidacy for the Texas Railroad Commission. Born at Abilene, he attended the Dallas public schools, University of Texas, and Southern Methodist University in 1933. He was employed in the petroleum engineering department of the Railroad Commission at Kilgore and Corpus Christi from 1934 to 1936; later he became geologist and drilling superintendent for an independent oil company in Corpus Christi; and in 1939 he opened offices in Austin as a petroleum geologist. Of the 41 months he spent in the Army, 25 months were served in the Southwest Pacific.

* * *

R. C. BROWN, associated with Continental Oil Company since 1924, has been appointed assistant manager of production and drilling in the Denver region to aid **J. C. Johnston,** regional manager. Brown was employed by Mutual Oil Company at Tulsa in 1924 as a clerk in the purchasing department and continued on when Mutual merged with Continental, and was transferred to Ponca City as a partnership clerk in the production accounting division in 1929. He was promoted to head partnership clerk in 1932.

* * *

C. W. GENTRY, former traffic clerk for Continental Oil Company at Ponca City, Okla., has been appointed assistant manager of railway sales for Continental with headquarters in Chicago. He succeeds **E. F. SHANNON,** recently appointed manager of the company's railway sales division.

* * *

WALTER W. BRADLEY, California State Mineralogist for the last 34 years, has announced he will retire July 1.

* * *

WALTER KEENE, San Joaquin Valley oil man and Taft, Calif., publisher, has been elected president of the Petroleum Club of Taft.

* * *

T. L. WARK has been made vice president in charge of production of Associated Division of Tide Water Associated Oil Company, with headquarters in San Francisco. Wark, a Stanford University graduate, started with the company as an assistant geologist. For more than a year he has occupied the position of general manager of the production department.

* * *

EDWARD H. CHANNEL, Shell Oil Company, has been promoted to natural gas and gasoline superintendent, with headquarters in Los Angeles. He was formerly plant foreman at Ventura.

DR. PAUL B. WILLIAMSON, consulting engineer, geologist, and geophysicist, who has been following oil since 1917, plans actively to resume his consulting practice and oil operations this summer. He has been an invalid confined to bed since 1942. Dr. Williamson is a fellow of the American Association for the Advancement of Science and a graduate of Alabama Polytechnic Institute (Auburn) and postgraduate of University of Wisconsin. Associated with him will be his son, **J. D. MITCHELL WILLIAMSON,** who has just returned as a lieutenant from 41 months in the Army Air Force. The latter attended Auburn and the universities of North Carolina and Chicago.

* * *

GUY S. BURSON has been appointed representative of the land department of Continental Oil Company in the Tulsa area. Burson, who will have offices in the Philtower Building, joined Continental in 1930 and resigned in 1943 when he joined the J. F. Lucey Petroleum Company, Houston, with whom he was associated until rejoining Continental.

* * *

R. G. HAMILTON, Tulsa, and **E. R. STRATTON,** Houston, both associated with Schlumberger Well Surveying Corporation, addressed the Kansas Society of Petroleum Engineers in Ellinwood, Kansas, on "Electric Log Interpretation."

* * *

A. M. BARBOUR, JR., recently discharged from the Army Air Corps, has resumed his position as vice president of the Corbett-Barbour Drilling Company, Tulsa.

* * *

A. S. BAILEY of Houston has retired as vice president of The Texas Pipe Line Company and Texas-New Mexico Pipe Line Company.

* * *

E. R. OSBURN, former superintendent of Texas-New Mexico Pipe Line Company with headquarters at Midland, has been named assistant manager of The Texas Pipe Line Company and Texas-New Mexico Pipe Line Company. **RALPH TROSETH** has succeeded Osburn as superintendent of the Texas-New Mexico Pipe Line Company at Midland.

* * *

WILLIAM A. PITTS, formerly of Los Angeles, has been named field representative in the Mid-Continent area by Baash-Ross Tool Company. His background includes more than 20 years' field experience with such organizations as the Chain Belt Company, Regan Forge & Engineering Company and the Axelson Manufacturing Company.

* * *

DWIGHT MAUCK, geologist in the Wichita Falls office of The Pure Oil Company, has been transferred to the company's Midland, Texas, office. **DENNIS LYMAN,** formerly in Jackson, Miss., office of Pure Oil, is now in charge of the Wichita Falls geological office.

* * *

EDGAR L. BROWN, production department employe of the Gulf Oil Corporation in the Fort Worth division office, has retired after 27 years of service.

* * *

S. M. REYNOLDS has resigned as geologist in the San Joaquin Valley, California, for **The Texas Company,** to become associated with **W. T. WOODWARD,** oil operator, of Taft, Calif.

* * *

CARLTON BEAL, Los Angeles petroleum engineer, addressed the Petroleum Accountants Society of Los Angeles on "Valuation of Oil and Gas Properties."

* * *

JAMES H. DOOLITTLE, Shell Oil Company vice president, spent some time recently at the San Francisco office of his company. He told a press conference that his duties with the company will pertain to oil exploration. Before the war he was in Shell's sales department.

* * *

C. K. STILLWAGON, president of Well Equipment Manufacturing Corporation, has been named president of the Texas Manufacturers Association. He has been associated with petroleum circles since 1915. In 1934, he organized his own company, and has been president and general manager since. He is the author of a recently published book, "Rope Chokers," of human interest stories, anecdotes, historical fragments and pictures, taken from his experiences in the oil fields.

C. K. Stillwagon

ED T. LANDGRAFF, connected with Oil Well Engineering Company for 20 years and American representative for the last three years, has been appointed a member of the Chiksan sales staff with headquarters in New York City. In addition to sales in domestic markets in the New York territory, he will serve as eastern representative of Chiksan Export Company. Associated with him is **ROY W. SEXTON,** who has been a member of the Chiksan sales staff for 3½ years and has been developing industrial markets in that area.

Ed T. Landgraff

* * *

W. GILBERT PRINCE and **JOHN M. PRINCE,** both of Houston, have obtained a Texas charter for the Prince Drilling Company, Inc., with capital stock of 120,000 shares at $1 each.

* * *

JOHN OWEN and **JAMES B. OWEN** and **R. N. JOHNSTON,** all of Tyler, and **T. A. JOHNSTON** of Los Angeles, have organized the Spartan Oil Well Servicing Company as a Texas corporation.

* * *

LEON BRACHMAN and **MARCUS GINSBURG,** both of Fort Worth, have organized the Elbar Oil Corporation and the LeBar Oil Company as Texas corporations.

* * *

JOHN P. MURRAY, 69, San Angelo, Texas, oil operator and former superintendent for Sinclair interests during the early development of the Teapot Dome field, Wyoming, died March 20 of a heart attack.

* * *

SELDON D. BUTCHER, Rocket Drilling Company, who served as a major in the Army Engineers in Europe for more than two years, has moved to Oklahoma City from Wichita, Kansas, and established an office in the Petroleum Building.

* * *

JOSEPH F. HEIL was elected president of The Heil Company, succeeding his father, **JULIUS P. HEIL,** founder of the company and president since its inception, who will continue in the business as a director and treasurer. Joseph Heil steps into the company's leadership after eight years of training in practically every phase of the business.

* * *

ROBERT S. BUBB has been named sales promotion and advertising manager of Dresser Manufacturing Division, Dresser Industries, Inc., Bradford, Pa. Bubb served four years with the Navy, from which he was discharged with the rank of lieutenant commander. Prior to his naval service, Bubb was engaged in industrial advertising and marketing activities in the New York area.

* * *

DR. T. S. OAKWOOD, professor of organic chemistry at Pennsylvania State College, addressed the Dallas Geological Society March 22 on the "Chemical Aspect of the Origin of Petroleum," based on studies made under a project of The American Petroluem Institute.

* * *

OTTO HAMMER and **BOB COOK,** vice presidents of Security Engineering Company, Los Angeles, recently made a field survey and sales trip of the Mid-Continent and Gulf Coast areas. Both attended the Dresser Industries general sales meeting at Mineral Wells, Tex.

* * *

WALTER A. BOWERS, former vice president and treasurer of the Lawrance Aeronautical Corporation, has been elected vice president and treasurer of the Aireon Manufacturing Corporation. He has spent 15 years in executive and administrative positions in the government service, including Public Works, Treasury Department, War Department, Commerce Department and War Food Organization.

* * *

GORDON P. STREET has been elected president of The Wheland Company, Chattanooga. His first connection with the company was in 1914, as office boy. Later he joined his father and an uncle who were the founders and owners of Street Brothers Machine Company.

Deaths

HARRY VAN NESS, 60, editor of *The Petroleum Journal* from 1916 to 1922 and a prominent business man of Wichita, Kansas, died at his home in Wichita March 25. Van Ness was a native Kansan and was a newspaper reporter before entering the oil business as an independent operator in Texas, Oklahoma, Arkansas and Kansas. At the time of his death he was business manager for the Consolidated Utilities Corporation, Wichita. He was one of the founders of the Swift Aircraft Corporation.

FRANK J. LOCKHART, 61, retired employe of the Phillips Petroleum Company, died at Winfield, Kansas, March 20. Until his retirement a year ago, Lockhart was reputedly the second oldest Phillips employe in point of service, having been with the company 38 years.

* * *

J. WALTER DIXON, 41, Tulsa, employed by the British-American Oil Producing Company and a Tulsa resident since 1918, died March 20.

* * *

MICHAEL DOUGHERTY, associated with Prairie Oil and Gas Company for 50 years and father of **JAMES P. DOUGHERTY,** Sinclair Prairie Oil Company scout in Wichita, Kansas, died in Independence, Kansas, March 23. Prior to his retirement several years ago, Dougherty was superintendent of Prairie's tank division.

GOING FISHING?

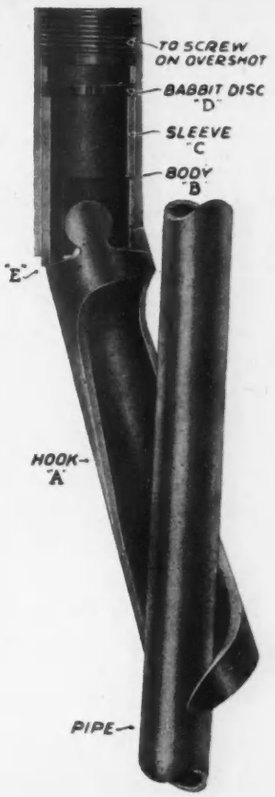
to catch that fish a good HOOK is necessary

When your fish is leaning into the wall or has fallen into a cavity or washout, a Big Four (Brauer) Hydraulic Wall Hook is the best means of straightening it up. Used *below* the overshot, this hook is safer because *no strain is placed on the hinged joint when a hard pull is required to free the fish.*

Many bad fishing jobs both in domestic and foreign fields have been cleaned up with these wall hooks where otherwise the hole would have to be plugged and the rig skidded.

Screwed to the bottom of the overshot, the hook is lowered below the top of the fish, and then lowered until it comes in contact with the fish. Then rotate hook right hand until fish is hooked. Hold tension on pipe and raise hook until entrance is above the top of the fish. Lower hook and overshot until top of fish strikes babbitt disc.

Available in a complete range of sizes for most A.P.I. tubing, casing and drill pipe. Complete information gladly furnished upon request.



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Brauer Portable Drilling Rig . . . Brauer Standpipe Gooseneck . . . Brauer Drill Pipe Floats . . . Brauer Long Sweep Ell . . . Brauer Improved Release Valve . . . Brauer Hydraulic Wall Hook . . . Brauer "Slim Hole" Swivel.

BIG FOUR MACHINE AND SUPPLY COMPANY

CLAY CITY, ILLINOIS

Foreman and Veteran

"The Foreman and the Veteran," by Ted Handelman, ex-sergeant in the Army, is a digest-sized manual for foremen, supervisors and department heads which deals with practical aspects of rehabilitating the veteran to civilian production jobs.

The author, a former writer for *Stars and Stripes* and an industrial relations expert in civilian life, writes from an intimate knowledge of both phases of the subject. Contents given include: An Opportunity for You; Three Types of Veterans; Six Changes You Need to Watch For; Six Traits You Can Profit From; Some Facts About Psycho-Neurosis; The First Impression; The Folow-Up; Counselling the Veteran Worker. There are four pages in the back to enable the foreman to keep track of the vets in his department. Obtainable from The National Foreman's Institute, Deep River, Conn., for 25 cents per copy.

From top to bottom Republic provides complete financial service for the petroleum industry. If you are contemplating a loan to help you over a production hurdle, why not drop in and discuss your requirements with any of our officers. You will be met with a clear and sympathetic understanding. When additional funds are needed, remember Republic.

REPUBLIC

NATIONAL BANK OF DALLAS

CAPITAL AND SURPLUS $20,000,000 LARGEST IN THE SOUTHWEST

Drilling Mud

American Cyanamid & Chemical Corporation has published a pocket-size booklet on "Chemical Treatment for Drilling Mud." This digest contains simplified discussions on characteristics of drilling muds, description of testing procedures, present practices for fast, safe, drilling with rotary tools, diagram of efficient surface system for handling drilling fluids, control methods relating to viscosity and water loss, a simplified description of chemical compounds that are used effectively in maintaining mud control and several pages of basic and important engineering data helpful in the treatment of drilling fluids.

A section devoted to the practical treatment and control of drilling mud gives general information and instructions in handling mud from the surface to deep holes in average wells, and lists several precautions in drilling through difficult zones such as "heaving shales" and salt caps.

The booklet may be had free of charge by addressing the company at 30 Rockefeller Plaza, New York 2.

Materials Timetable

To help industry's long and short-term planning, a new supply timetable indicating when the end of current material shortages may be looked for, has been published by the New York Journal of Commerce. Improved supplies of copper, sugar and rubber are already in the making, but acute shortages of lead, tin and building materials continue in effect with steel, paper, leather, industrial textiles and floor coverings not far behind.

All of the multiple factors influencing the supply situation in 21 basic raw materials are brought up to date in this new study. The probable end of acute scarcities and the eventual date when supply and demand will be balanced is also spotlighted in the timetable. Copies of "Scarce Materials Timetable" may be had at 25 cents from the New York Journal of Commerce, 63 Park Row, New York 15.

Surplus Tools

A pocket-sized pamphlet, "How to Buy Surplus Machine Tools," published by the National Machine Tool Builders' Association, is a guide and advisory booklet on buying surplus government machine tools.

Facts given on the subject are reviews of experiences of manufacturers as told to its members, plus information secured by the Association from the offices of the War Assets Corporation. It is printed in question-and-answer style and gives the prospective buyer of government goods the procedures for making purchases.

The formula used in calculating prices by the government agencies is also given, as well as the addresses and names of assistant managers at War Assets Corporation headquarters over the country. The pamphlet may be obtained from the National Machine Tool Builder's Association, 10525 Carnegie Avenue, Cleveland 6.

Howard Pape Becomes Jarecki General Distribution Manager

Howard Pape has been named general manager of distribution for Jarecki Manufacting Company's "Oil Country" distribution, effective April 1.

Howard Pape

Pape joined Tide Water Associated Oil Company in 1915 and a year later joined the Mid-Continent Petroleum Corporation, advancing to the position of chief engineer and mechanical superintendent. He spent ten years in this connection.

In 1927 he became associated with Crane Company, specializing in the development, sale and distribution of its products to the oil industry. He left Crane in 1944 to become vice president of the W-K-M Company of Houston.

Arc Welders Offered by War Assets Corporation

The War Assets Administration is offering for sale a large quantity of 300 to 400 ampere MG type arc welders. Both DC gasoline-driven and AC sets are available. Principal makes are Hobart, Lincoln and Westinghouse. Welding equipment for production line work is being offered. Resistance welders for spot, seam, butt and flash type welding either in the portable or the gun operated series are listed.

Other welding accessories and related equipment may be purchased from war surpluses being sold by the administration. Detailed information is available from the various branches of WAA.

Tulsa Firm Will Distribute Continental Motors Products

The Midwestern Engine and Equipment Company, new Tulsa firm, has been awarded the midwestern distributorship for Continental Motors Corporation.

F. E. Stanley is president and sales manager, G. O. Glandon is assistant sales manager, and Armon H. Bost is secretary-treasurer. Their territory for Continental Motors will range from the Mississippi west to the mid-Rockies, and from Canada to just short of the Gulf Coast.

Goodrich Installs Cold Room To Test Rubber and Plastics

A cold room in which rubber and synthetic rubber compounds and products of many types, plastics and other materials can be tested at temperatures down to 90° F. (90 below zero) has been installed by The B. F. Goodrich Company at its Akron plants.

Thirty feet long, 15 feet wide, the cold room has five working units, each six feet square, cooled by a three-stage compressor unit and a single stage compressor using Freon 12 and 22 as refrigerants. Each unit operates separately, with electrically controlled temperatures charted for a 24-hour study at different levels.

Hydraulic Products Company To Offer Industry Equipment

Hydraulic Products Company, which has specialized in hydraulic valves for industrial uses, will shortly introduce a new line of hydraulic equipment for use in the oil industry. Ben F. Kelley, Tulsa oil field equipment inventer and manufacturer, who has been elected a director of the company, said the Ben F Kelley Company has been appointed Mid-Continent distributor for the firm.

Caterpillar Manufacturing Development Division Formed

Formation of a manufacturing development division at Caterpillar Tractor Company under direction of C. A. Matheny was announced by J. R. Munro, general factory manager.

C. A. Matheny

Operating as a section of the general planning department, the new division will screen ideas for the improvement and development of manufacturing processes that originate in various departments throughout the plant.

Matheny formerly was factory superintendent at the Peoria plant and as works manager of Caterpillar Military Engine Company.

Brown Instrument Opens Office; Two Promotions Are Announced

The Brown Instrument Company, division of Minneapolis-Honeywell Regulator Company, has opened a sales and service office at Rochester, N. Y., under the supervision of Gerald L. Britton. Two promotions were also announced by the company. O. J. Richardson, who served as sales engineer and in other capacities at the Philadelphia company's Cincinnati, Buffalo and Pittsburgh branches during the past ten years, has been appointed industrial manager of the Detroit branch. George W. Brown, for the past nine years sales engineer in Chicago, Louisville, Philadelphia and New York for the Philadelphia industrial division, has been appointed industrial manager of the Cincinnati office of The Brown Instrument Company.

Filter Offices Moved

Filter Media Corporation has moved its factory and main office from Irvington-on-Hudson, N. Y., to Hamden, Conn., where it will have larger quarters. Branch offices in Chicago and Salt Lake City will be continued.

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FPC Sets Hearing on Plan For 70-Mile Kentucky Line

The Federal Power Commission will hold a hearing May 6 on the application of the Cincinnati Gas Transportation Company for authority to construct 70 miles of 14-inch pipe line to connect its 20-inch line at Foster with the 24-inch line of the Tennessee Gas and Transmission Company at Means, Ky.

Announcement also was made of suspension until August 14 of supplemental rate schedules filed by T-G-T which would increase its wholesale rates to the Hope Natural Gas Company and United Fuel Gas Company. Hearings on the lawfulness of the rates will be held on a date to be fixed later.

Permanent authority has been granted by the commission to the West Texas Gas Company to operate approximately eleven miles of 10¾-inch loop line in Hale County, Texas, and an additional compressor at its McSpadden station, built last year under temporary certificate to provide needed service for its Texas customers.

Oklahoma U. Sponsors Gas Measurement Short Course

The University of Oklahoma College of Engineering is sponsoring the 21st annual Gas Measurement Short Course to be held at the University in Norman April 23, 24 and 25. W. H. Carson, dean of the School of Engineering at the University, is chairman of the committee sponsoring the course.

The three-day program has been developed from programs used in the past with the inclusion of additional subjects which will highlight the latest developments in equipment and methods pertaining to the measurement and regulation of gas.

Registration will begin at 8 a.m. April 23 in the Engineering Building. There is an enrollment fee of $4.50 which includes all charges for attending the course and entitles the registrant to a copy of the printed proceedings which will be published in bulletin form, and a copy of the Practical Methods Report which is to be issued this year.

AGA Research Group

The American Gas Association has formed a committee on economic and market research needs, under the chairmanship of E. H. Eaker, vice president of Boston Consolidated Gas Company. AGA President Everett J. Boothby said the objective of this committee will be to review economic and market studies recently made or started and to determine the needs of the industry for further marketing and economic research.

Wyoming Lines

The Nomenclature Committee of the Wyoming Geological Association has prepared a list of structures of Wyoming, showing alphabetically the name of counties, townships and ranges. An attempt has been made to show which structural names are synonymous. Multilithed copies may be obtained from the secretary-treasurer, P.O. Box 545, Casper, Wyoming, for 50 cents per copy.

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